EUROPEAN VULTURE CONFERENCE

Abstract Book

#VULTURES2019

Introduction to the **European Vulture Conference.**

From 30th September – 4th October 2019, in Albufeira, Portugal, the Vulture Conservation Foundation will bring together a wide range of stakeholders involved in all aspects of vulture conservation and research from across Europe and beyond, during the first European Vulture Conference.

More than 70 oral presentations and 34 posters are included in the three day scientific programme, providing conference participants the opportunity to present an overview of contemporary knowledge and work and, most importantly, identify current and future priorities for vulture research and conservation.

Key topics to be covered during the conference will include the following, under the general theme of "existing knowledge and future priorities":

- Fundamental biology and ecology of vultures
- Effective applied research: linking data with conservation action
- Past, current and future status of threatened vulture populations
- Standardization of monitoring and analysis methods
- Captive breeding and reintroduction strategies
- Human aspects of vulture research and conservation

The conference will therefore create a unique opportunity to collate and review existing methods and knowledge of a wide variety of topics and provide a platform to discuss their future development towards effective and standardized approaches for vulture research and conservation.

Symposia and workshops

In addition to the oral presentations and poster sessions, there will be several sessions dedicated to some of the priority topics in vulture conservation and research. During the last session of day two there will be four symposia covering the following topics:

- Supplementary feeding strategies in Europe
- Energy infrastructure and vultures
- Supplementary feeding strategies in Portugal
- Griffon Vulture monitoring in the Balkans

The symposia will be a combination of short talks on pressing issues in vulture conservation and research, followed by open discussions facilitated by experts from different countries. The aim is to discuss the most urgent or emerging issues for each of the topics, identify priorities and knowledge gaps and propose potential solutions. These will all be recorded and result in an output, such as a publicly available short report or peer-reviewed article, covering each aspect of the discussion and ultimately proposing “the way forward”.

In addition to the symposia, there will also be a workshop on captive breeding of vultures for conservation purposes, facilitated by experts working with all European vulture species and from the wider ex situ conservation community. Related to this, during the lunch break on the third day of the scientific programme there will be an open meeting with the Antwerp Zoo Foundation during which they will outline how they are stepping up their role in international efforts to restore Cinereous Vulture populations.

At the end of the first day of the scientific programme Dr Orr Spiegel from the School of Zoology at Tel Aviv University will share his extensive experience of the practicalities of analysing vulture movement data by demonstrating how to download, process and visualize tracking data from the Movebank database using the move package for R, as well as how to create animated tracks using the moveVis package. The session will last approximately 1 hour and the code and necessary files can be downloaded here: http://github.com/OrrSpiegel/MoveanAnalysDemo.

In addition to the important session discussing progress with the implementation of the Multi-species Action Plan to Conserve African-Eurasian Vultures after lunch on day three, the IUCN Vulture Specialist Group (VSG) will hold a round table discussion about the VSG’s role, objectives and future directions, as well as the benefits of VSG membership for the vulture research and conservation community.

SUPPORTERS ORGANISER MAIN SPONSOR

Scientific programme and list of abstracts

After being anonymized and scored by the scientific committee, nearly all submitted abstracts were included in the programme either as standard talks, speedy talks or posters, providing a diverse selection of topics from a wide geographical range. We thank everyone who submitted abstracts and those presenting their work for sharing their knowledge and expertise with the vulture research and conservation community. We also thank the scientific committee for reviewing the many submitted abstracts.

Scientific committee:

Alvaro Camiña – VCF advisory board

Olivier Duriez – VCF advisory board

Ohad Hatzofe – VCF advisory board

Daniel Hegglin – VCF management board

Marleene Huyghe – VCF advisory board

Franziska Lörcher – VCF staff

Raphaël Néouze – VCF advisory board

Louis Phipps – VCF staff

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EUROPEAN VULTURE CONFERENCE

01 OCTOBER 2019

AUDITORIUM

ATLANTIC ROOM

EVENT SCHEDULE
scientific programme

8:00	Registration	
9:00	Welcome	
10:00	François Sarrazin Restoration and conservation of scavenger populations	
10:30	Franziska Lörcher Bearded Vulture reintroduction in Europe	
11:00	Coffee Break	
11:30	Orr Spiegel Vulture foraging movements as a mixed strategy and its dependency on social information	
12:00	Olivier Duriez Flight and foraging decision making in Griffon Vultures	
12:30	Questions & discussion	
12:40	Pascual López-López Spatial and temporal variability and flexibility in migration of a globally endangered avian scavenger across three continents	
12:55	Andrea Santangeli Priority areas for conservation of Old World vultures	
13:10	Questions & discussion	
13:15	Lunch & Poster session I	
	AUDITORIUM	ATLANTIC ROOM
14:45	Daniel Hegglin GPS tracking in vulture conservation: science, surveillance and communication	Juan Carlos del Moral National census of vultures in Spain
15:00	Marina Garcia-Alfonso Conservation through the spatial ecology of the Canarian Egyptian Vulture	Carlos Pacheco Vultures in Portugal: an historical perspective
15:15	Clémentine Bougain GPS tracking and ground-searches for nests of the globally endangered Egyptian Vulture (*Neophron percnopterus*) reveal a large, apparently intact population in Oman	Sylvia Zakkak Long-term trends in population size and breeding success of Endangered Cinereous Vulture in Dadia-Lefkimi-Soufli Forest National Park, NE Greece
15:30	Questions & discussion	Questions & discussion

	AUDITORIUM	ATLANTIC ROOM
15:40	**Typhaine Rousteau** Assessment of the potential recovery of a reintroduced species, the Cinereous Vulture in France, by modeling the breeding habitat suitability.	**Fiammetta Berlinguer** How is LIFE going Under Griffon Wings? An update on the status of the Griffon Vulture *(Gyps fulvus)* population in Sardinia
15:55	**Jon Morant Etxebarria** Movements and population structure of a unique wintering population of the globally endangered Egyptian Vulture south-western Europe	**Nikos Kassinis** Griffon Vultures of Cyprus – legacy of conservation past and looking to the future
16:10	**Ohad Hatzofe** Location-aware alert system for wildlife poisoning using GPS tagged vultures	**Joaquim Teodósio** LIFE Rupis – Conservation of Egyptian Vulture and Bonelli's Eagle in the Douro Valley
16:25	Questions & discussion	Questions & discussion
16:30	Coffee break	
	AUDITORIUM	ATLANTIC ROOM
17:00	**Ruth García Jiménez** How do juvenile Bearded Vultures use supplementary feeding stations?	**Juan Jiménez** News from the Maestrazgo Bearded Vulture project
17:05	**Natasha Peters** Factors affecting movement and foraging behaviour of the critically endangered African White-backed vultures in Southern Tanzania	**Toni Wegscheider** Bearded and Griffon Vultures in Germany - Possibilities of Bavarian Conservation Supports for the Eastern Alps
17:10	**Louis Phipps** Movements and space use of Egyptian Vultures tracked from the Douro Valley	**Samuel Infante** The return of Cinereous Vulture in Portugal after 40 years extinct
17:15	**Natividad Aguilera-Alcalá** Do transhumant livestock and vultures move together?	**Volen Arkumarev** Individual identification of Egyptian Vultures based on black facial marks
17:20	Questions & discussion	Questions & discussion
17:30	**Carlota Viada Sauleda** Terrasse Plan: a multispecies recovery, conservation and monitoring plan for the Balearic Island raptors	**Saša Marinković** Evaluation of changes in the size of the migratory part of the population of juvenile Eurasian Griffon Vultures
17:35	**Sidi Imad Cherkaoui** Vultures are under severe decline in Morocco	**José María Fernández-García** Long-term recovery of vulture populations: insights from Gipuzkoa (Northern Spain)
17:40	**Kulojyoty Lahkar** Conservation issues of critically endangered *Gyps* vultures in Assam, India	**Justo Martín** The value of international cooperation for monitoring raptor populations in the Western Mediterranean: lessons learned from Atlas Programme in Morocco
17:45	**Eleftherios Kapsalis** Use of veterinary drugs affecting vultures: Current status in the Balkans	**Francis Martens** A comparative study of bird flight height: man vs photogrammetry
17:50	Questions & discussion	Questions & discussion
18:15	**Orr Spiegel** Demonstration of *move* and *moveVis R* software packages for analyzing tracking data	

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EUROPEAN VULTURE CONFERENCE

02 OCTOBER 2019

AUDITORIUM

ATLANTIC ROOM

INDIAN ROOM

PERSIAN ROOM

EVENT SCHEDULE
scientific programme

09:00 Iñigo Fajardo
What can wildlife crime analysis do for vulture conservation?

09:30 André Botha
Making progress towards the conservation of sub-Saharan African vultures within the framework of the CMS Vulture MsAP

10:00 Chris Bowden
Coordinating a regional response to the Asian Vulture Crisis, including the creation of the 'SAVE' consortium, with updates on where things stand

10:15 Questions & discussion

10:25 David de la Bodega Zugasti
25 years of illegal poisoning in Spain

10:40 Marta Herrero
Monitoring NSAIDs in carrion and vultures after diclofenac registration for veterinary use in Spain

10:55 Questions & discussion

11:00 Coffee break

	AUDITORIUM	ATLANTIC ROOM
11:30	Philippe Helsen Genetics as an invisible layer of information to evaluate and improve reintroduction strategies	Yael Choresh Exposure of Griffon Vultures (*Gyps fulvus*) in north Israel to environmental contaminants and possible effects on breeding success
11:45	Franziska Lörcher Feathers tell a story: Genetic monitoring of Bearded Vultures in the Alps	Nili Anglister Plasma cholinesterase activity in the Eurasian Griffon Vulture (*Gyps fulvus*) in Israel
12:00	Orr Spiegel Long range forays by three vulture species - optimal foraging or failed attempts of breeding dispersal	Ilka Champly Origin of lead and saturnism risks for Bearded Vultures in the French Alps
12:15	Questions & discussion	Questions & discussion

	AUDITORIUM	ATLANTIC ROOM
12:25	**Estelle Sandhaus** California Condor nest management in Southern California	**Rubén Moreno-Opo** Feeding within the crowd: behavioral and conservation implications for European vultures
12:40	**Enrico Bassi** Long-term simultaneous surveys and photo-identification: important tools to monitor a reintroduced Bearded Vulture population	**Elzbieta Kret** Sniffing dogs at the service of vultures - results from the operation of the first anti-poison dog units in the Balkans
12:55	**Campbell Murn** Using known occupancy areas to understand what affects detection probability of big raptors like vultures	**David Izquierdo** Assessing vulture mortality at a continental scale: the benefits of centralized and standardized data
13:10	Questions & discussion	Questions & discussion
13:15	Lunch & poster session II	
14:45	**Supplementary feeding strategies in Europe** Symposium Room: AUDITORIUM	**Energy infrastructure and vultures** Symposium Room: ATLANTIC
		Captive breeding of vultures Workshop Room: INDIAN
16:45	Coffee break	
17:15	**Supplementary feeding strategy in Portugal** Symposium Room: AUDITORIUM	**Griffon Vulture monitoring in the Balkans** Symposium Room: INDIAN
	IUCN Vulture Specialist Group Round table Room: ATLANTIC	**Artists' demonstration and presentation** Room: PERSIAN

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EUROPEAN VULTURE CONFERENCE

03 OCTOBER 2019

AUDITORIUM

ATLANTIC ROOM

EVENT SCHEDULE
scientific programme

	AUDITORIUM	ATLANTIC ROOM
09:00	**Steffen Oppel** Conservation of Egyptian Vultures in eastern Europe – can population reinforcement compensate for diverse threats among continents?	
09:30	**Ron Efrat** What affects the survival probability of reintroduced Griffon Vultures in Israel?	
09:45	Questions & discussion	
09:55	**Álvaro Camiña** Vultures and wind energy, is a balance possible? A worldwide perspective	
10:10	**Simon Potier** Vision, foraging and collision in raptors	
10:25	**Ricardo Tomé** How can the use of turbine shutdown on demand and radar reduce the risk of collision for vultures in wind farms	
10:40	Questions & discussion	
10:45	Coffee break	
11:15	**Juan Manuel Pérez García** Long-term knowledge of home range behaviour of territorial Bearded Vulture in Pyrenees through GPS monitoring: lessons to improve management actions	**Elena Kmetova-Biro** Current results of the restoration efforts of large vultures in Bulgaria
11:30	**Eneko Arrondo** Health status and survival rates of Iberian Griffon Vulture through GPS monitoring	**Raphaël Néouze** Restoration of Bearded Vulture's corridor between Alps and Pyrenees: the program LIFE GYPCONNECT
11:45	**Lorena Juste** Brinzola's trip: making use of dependence and dispersion periods to improve Cinereous Vulture population management	**Alexandra Howard** Rehabilitation and release success of an African vulture conservation programme
12:00	Questions & discussion	Questions & discussion

	AUDITORIUM	ATLANTIC ROOM
12:10	**Volen Arkumarev** Griffon Vulture dependence on feeding stations under high natural food availability conditions	**Alfonso Godino** First study of the juvenile dispersion of the Cinereous Vulture *(Aegypius monachus)* in Portugal
12:25	**Corinne Kendall** Population range and connectivity of three species of *Gyps* vultures in Africa: A continent-wide perspective	**Vladimir Dobrev** Restocking the Egyptian Vulture in the Balkans – preliminary results
12:40	Questions & discussion	Questions & discussion
12:45	Lunch & poster session III	
	ATLANTIC ROOM	
13:15	**Open meeting during lunch break** The Antwerp Zoo Foundation steps up its role in the Cinereous Vulture international recovery efforts	
	AUDITORIUM	
14:15	Multi-species Action Plan to Conserve African-Eurasian Vultures: Update and discussion	
15:15	**Patricia Mateo-Tomás** The challenge of managing human-mediated carcasses for vulture conservation	
15:45	**Paula Martin Díaz** Rewilding processes shape the use of mediterranean landscapes by a top avian scavenger	
16:00	Questions & discussion	
16:15	Coffee break	
16:45	**Ainara Cortés-Avizanda** Integrating vulture ecology, conservation biology and stakeholders' perception	
17:15	**Fátima Domínguez Gigante** The role of sanitary policies for carcass management on farmers' perceptions	
17:30	**Jovan Andevski** Vulture status and anti-poisoning work in the Balkan Peninsula	
17:45	Questions & discussion	
18:00	Closing Session	

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SUPPORTERS ORGANISER MAIN SPONSOR

Poster	Title	First author
#1	Cinereous Vulture pattern of presence in the Eastern Rhodopes, Bulgaria	Volen Arkumarev
#2	First conservation initiative on the profile of the Egyptian Vulture *Neophron percnopterus* (Aves, Accipitridae) at the Tlemcen National Park (North-West Algeria)	Haféda Benmammar Hasnaoui
#3	Past and current use of poison baits in Albania, their effect on vultures and other wildlife species	Taulant Bino
#4	Ecological consequences and socioeconomic implications of the arrival of Griffon Vultures to Mallorca: presentation of a novel project	Ainara Cortés-Avizanda
#5	Fight against illegal poison: from causes to judicial process	Julieta Costa
#6	Griffon Vulture population trend and size in the Eastern Rhodopes at the crossroads to Asia	Dobromir Dobrev
#7	Life Egyptian Vulture (www.lifegyptian.it) A chance to save the Egyptian Vulture on the Italian mainland	Andrea Ferri
#8	Supplementary feeding stations as a tool for the conservation of endangered avian scavengers: Monitoring and news strategies	Iván Gutiérrez
#9	Mosquito vectors and mosquito transmitted pathogens in bearded vulture *(Gypaetus barbatus)* breeding territories	Ursula Höfle
#10	Causes of non-natural mortality of Egyptian Vultures *Neophron percnopterus*, Griffon Vulture *Gyps fulvus* and Cinereous Vulture *Aegypius monachus* in Portugal	Samuel Infante
#11	Captive breeding of Cinereous Vultures at GREFA	Pablo Izquierdo
#12	Use of veterinary drugs affecting vultures: Current status in the Balkans	Eleftherios Kapsalis
#13	Ex-situ vulture care at the Wildlife Rescue Centre of Green Balkans	Ivaylo Klisurov
#14	Development of a Multi-species Action Plan for Vultures in Greece: a first step towards an integrated approach for vulture conservation	Panagiotis Kordopatis
#15	Could lead poisoning in vultures be a reason of population reduction in Albania?	Kastriot Korro
#16	European Black Vulture: a global approach for conservation actions	Fanny Martin-Blais
#17	Recent colonization of Mallorca by Griffon Vulture	Jordi Muntaner
#18	Interactions between Pied Crows and breeding White-backed Vultures	Campbell Murn
#19	How did we get to the endorsement of Local Action Plans against poisoning in Greece? A small victory to a continuous battle	Konstantina Ntemiri
#20	Environmental education for vultures – the case of Life Rupis in the Douro Valley	Vanessa Oliveira
#21	Retrospective study of causes of death on Griffon Vulture *(Gyps fulvus)* in Friuli Venezia Giulia, Italy, from the year 2012	Stefano Pesaro
#22	Recent conservation specifics and related priorities in the conservation of vultures in Balkans, compared to Iberian Peninsula	Hristo Peshev
#23	Estimating Griffon Vulture *(Gyps fulvus)* population abundance from simultaneous winter counts at roosts	Mario Posillico
#24	Population viability analysis of the Eurasian Griffon Vulture *(Gyps fulvus)* population in central Italy	Mario Posillico
#25	Poison against predators: a conflict without solution?	Victoria Saravia
#26	Colony-shifting and intra-colony nest movements of Eurasian Griffons *(Gyps fulvus)* in a period of 15 years	Goran Susic
#27	Pathomorphological investigation and the causes of deaths in 2018 – 2019 as a step in protection and conservation of Griffon Vultures *(Gyps fulvus)* population in Croatia	Marina Tisljar
#28	Population status of the Egyptian Vulture *(Neophron percnopterus)* in Albania	Mirjan Topi
#29	Age and season-related distribution patterns of the Bearded Vulture *(Gypaetus barbatus)* in the Swiss Alps, a base for predicting conflict-zones with wind energy construction	Sergio Vignali
#30	Vulture research and conservation in Niger	Cloé Pourchier
#31	Illegal use of poison in Portugal: the possible portrait	Paulo Marques
#32	Egyptian Vulture New LIFE Project: "Urgent actions to strengthen the Balkan population of the Egyptian Vulture and secure its flyway"	Dima Obeidat
#33	Status, population recovery and conservation of the Black Vulture *Aegypius monachus* on Mallorca	Evelyn Tewes
#34	Safe Flyways – reducing energy infrastructure related bird mortality in the Mediterranean	Osama Alnouri

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VCF VULTURE CONSERVATION FOUNDATION

Aguilera-Alcalá, Natividad
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Speedy talk

Do transhumant livestock and vultures move together?

Natividad Aguilera-Alcalá, Eneko Arrondo, Zebensui Morales-Reyes, Marcos Moleón, José A. Donázar, José A. Sánchez-Zapata

Transhumance is a traditional livestock practice consisting of seasonally moving livestock to feed on natural pastures. This activity is in decline due to rural abandonment and changes towards intensive livestock farming. Scavenging birds may be affected in their food availability if traditional livestock practices are reduced or disappear. We tracked griffon vultures with GPS and accelerometers to analyse individually the use of space and their link with transhumant herds in Campos de Hernán Perea (Sierra de Cazorla, Segura y las Villas Natural Park, Spain) over four years. Specifically, we measured the flight frequency and feeding events according to the season of presence or absence of the herds in the study area. To know the arriving and departure date of herds, we made interviews to the shepherds involved. Our results show that griffon vultures increased their flight frequency and more feeding events were recorded when sheep herds were summering in the study area. Transhumance seems to have an effect on the foraging behaviour of vultures providing them with a source of food derived from sustainable livestock management. Conserving transhumance practices might promote the availability of natural food for vultures along their ancestral routes.

Alnouri, Osama
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Poster
#34

Safe Flyways – reducing energy infrastructure related bird mortality in the Mediterranean

Alnouri, Osama
Rapid economic growth is one of the main features of many Mediterranean economies, which is driving a growth in demand for electricity that is to be met from wind energy and the development of powerline networks. However, it has become clear that the infrastructure associated with these energy sector installations can have negative impacts on migratory bird populations. Specifically, collision and electrocution from energy sector infrastructures are known to be significant threats to migratory soaring birds and vultures in the Mediterranean region. This is particularly the case when energy sector developments are placed within important sites along their migratory routes along the Africa-Eurasia flyway. To respond to these challenges, leading NGO's joined forces to act towards reducing energy infrastructure related bird mortality in the Mediterranean. The coalition includes Vulture Conservation Foundation (VCF), IUCN Med, EuroNatur, WWF Greece and is coordinated by BirdLife International. The Safe Flyways Energy project in its Phase I (2017-2020) builds previous expertise and progress by its partners to support:
1) An improved understanding of the impact of energy infrastructures on bird populations at the Pan-Mediterranean level, including identification of the sites with the highest (potential) risks for collision and electrocution,
2) Assessment of the effectiveness of existing and new mitigation measures, and use of this information to strengthen international policies,
3) National action in four priority countries (Egypt, Greece, Morocco and Jordan) for strengthening national guidelines, legislations and their implementation.
4) Direct local level action to support adequate implementation of mitigation measures for energy sector infrastructures in priority development projects and sites in these four countries,
5) Engagement with organisations involved in energy issues in other Mediterranean countries through information sharing, training and support to targeted interventions to assist them in addressing collision and electrocution of birds with energy infrastructures.
Priority countries (Egypt, Greece, Morocco and Jordan) were selected for targeted national action based on the rapid growth of their energy sectors and the current engagement of the full spectrum of stakeholders on addressing the issue (including active CSOs with adequate capacity to take action and International Financial Institutions (IFI's)). Work in these countries will provide best practice case studies to be shared across the region and an opportunity to strengthen the commitment of national governments to relevant MEAs. Moreover, the project is supporting a number of national NGO-led initiative in a number of countries including Bosnia and Herzegovina, Croatia, Montenegro. Portugal, Slovenia, Spain and Turkey.
This project is being implemented by a generous contribution of MAVA Foundation. Project partners are now preparing Phase II of the project till 2022 along with a longer term plan for beyond 2022.

Andevski, Jovan
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Standard talk

Vulture status and anti-poisoning work in the Balkan Peninsula

Jovan Andevski and Uros Pantovic
The use of poisonous substances is considered one of the most important threats regarding illegal killing of birds of prey, and vultures in particular, but it also represents a serious threat for human health. The vultures of the Balkan Peninsula reached a critical conservation status at the end of the 20th and beginning of the 21st century mainly due to poisoning. The Bearded and Cinereous Vultures are now on the edge of regional extinction. The number of Egyptian Vultures in the Balkans has declined by more than 50 % in the last ten years, and continues to decline. Strong Griffon Vultures populations remain in Serbia, Croatia and Bulgaria. The most common type of wildlife poisoning in the Balkan region is the use of poison baits to kill predators. Based on data that VCF compiled, in the last 20 years a total of 465 vultures have died from poisoning. If we consider that approximately only 20 % of poisoning incidents are ever discovered, we can estimate that about 115 vultures are potentially being poisoned annually throughout the Balkans. We can say with certainty that wildlife poisoning is the most significant threat for vultures in the Balkans. There is a significant lack of awareness about the severity of wildlife poisoning. Low awareness is present not only amongst governmental institutions, but also the general public, which is why in many countries it has a low priority for enforcement agencies and judiciary system. Therefore, the Balkan Anti-poison Project (BAPP) aims to address this conservation issue though a multi-stakeholder involvement process by providing a comprehensive, regional and coordinated approach and applying best-practice experience from EU countries which have achieved very good results in dealing with this issue.

Anglister, Nili
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Standard talk

Plasma cholinesterase activity in the Eurasian Griffon Vulture, *Gyps fulvus* in Israel

Nili Anglister, Shira Gonen-Shalom, Ariela Rosenzweig-Büeller, Orr Spiegel, Ohad Hatzofe, Roni King, Igal Horowitz, Lili Anglister

The Griffon vulture (*Gyps fulvus*; GV) is deteriorating in the eastern Mediterranean, and considered as critically endangered in Israel. Although, poisoning through exposure to organophosphate (OP) and carbamate (CB) insecticides is the main threat, our ability to reliably diagnose these materials is limited since clinical signs may not be specific, and OP/CB levels are often undetectable. However, activity of cholinesterase (ChE) enzymes in plasma can be used as an alternative, non-destructive, biomarker for diagnosing exposure in live vultures. Yet, the applicability of this approach has been limited by species, age and sex variation of ChE basal levels. This study aims to provide a benchmark for ChE activity levels in healthy GVs and its intraspecific variation.

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Poster
#1

Cinereous Vulture pattern of presence in the Eastern Rhodopes, Bulgaria

Volen Arkumarev, Dobromir Dobrev, Anton Stamenov, Atanas Delchev, Stoycho Stoychev
Common and widespread in the past, nowadays the Cinereous vulture (*Aegypius monachus*) is considered extinct as a breeder in Bulgaria. The only breeding colony of the species on the Balkans survives in the National Park of Dadia-Soufli-Lefkimi forest in Greece, about 25 km from the Bulgarian border. Individuals from that colony regularly forage and feed in the Eastern Rhodopes. We studied the pattern of presence and flight movement corridors of the Cinereous Vulture in Bulgaria during 2016-2017 from stationary viewpoints and regular observations at supplementary feeding stations. Visual observations from 19 stationary viewpoints were conducted between December and May each year. We observed 47 Cinereous vultures with species being recorded in 37% of the days with observations. At supplementary feeding stations 97 Cinereous Vultures were observed. Vultures were mostly foraging solitarily or in small groups of up to 3 individuals. However, bigger groups of up to 5-8 individuals were observed at the feeding stations. Highest numbers were recorded in March and April. The age was determined for 77.5% of the observed individuals with immatures being the most numerous group (56.4%), followed by adults with 28.2%. In total 20 tagged Cinereous vultures were recorded and half of them were recorded more than once with one individual observed in 15 occasions. The main flight movement corridors used by the species between Bulgaria and Greece followed the river valley of Byala reka and Dushundere stream within 2 SPAs – “Byala reka” and “Most Arda”. Obtaining comprehensive information on the numbers, pattern of presence and the flight movement corridors of the Cinereous vultures foraging in Bulgaria served to inform the conservation strategy for the species and enhance the chances for its successful comeback.

Arkumarev, Volen
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Speedy talk

Individual identification of Egyptian Vultures based on black facial marks: an alternative method for estimating adult survival and turnover rates within breeding pairs

Volen Arkumarev, Vladimir Dobrev, Anastatios Bounas, Dimitris Vavylis, Elzbieta Kret, Emil Yordanov, Victoria Saravia

The Egyptian Vulture (*Neophron percnopterus*) is the most endangered vulture species in Europe. Its population on the Balkans has declined by 80% over the past 30 years. The main cause for the population collapse is increased mortality due to various threats which the species faces along the flyway and both in the breeding and wintering grounds. Adult survival is the key demographic parameter that needs to be boosted to secure population recovery. Evaluating survival is challenging and usually requires capturing to ring and/or tag individuals. We tested an alternative method for individual identification of Egyptian Vultures based on the existence of black facial marks which differ in size and shape among individuals. In order to individually monitor the vultures and to estimate the adult survival and the turnover rates within the breeding pairs, a photo-catalogue was created and updated every year for Bulgaria and Greece. In addition, we studied the pattern of presence and estimated the number of different individuals visiting the central feeding station in the core of the population. Data was collected by high quality photos from vulture viewing hides and trap/video cameras installed in nests of breeding pairs and at the central feeding station. Our catalogue now contains photos of 39 adult and subadult Egyptian Vultures. We managed to identify 23 individuals from 15 breeding pairs, ca. 30% of the breeding vultures in Bulgaria and Greece and monitor them from 2 up to 14 years. Our study confirmed that the facial marks do not change over time and can be used as a reliable method for individual identification of adult and subadult Egyptian Vultures in the field. This method opens new possibilities to study the demography of the species especially in small populations helping practitioners prioritize their conservation efforts to secure the survival of this endangered vulture.

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Standard talk

Griffon Vulture dependence on feeding stations under high natural food availability conditions

Volen Arkumarev, Anton Stamenov, Nikolay Terziev, Atanas Delchev, Stoycho Stoychev and Dobromir Dobrev

Supplementing vulture populations with carcasses disposed at feeding stations is a common management and conservation practice worldwide. However, some studies revealed that supplementary feeding stations can alter the feeding and foraging patterns of vultures and even cause some unintended outcomes such as reduction of productivity in some vulture species. We studied the feeding pattern and dependence on feeding stations of 11 Griffon vultures tagged with GPS-GSM transmitters in Eastern Rhodopes, Bulgaria. We used combination of remote sensing of high-resolution data on vultures' movements and behavior and field inspections to identify the vulture feeding events. Our results show that most of the feeding events occurred at occasional carcasses found in the wild (73.1%) while 26.9% were at supplementary feeding stations. Vulture's reliance on feeding stations was lowest in summer when 80.2% of the feedings were at carcasses found in the wild, but increases in winter when 56.5% of the feedings were at the supplementary feeding stations. Griffon Vultures travelled longer distances and had less straight flight in days feeding in the wild compared to days when they were not feeding or were visiting feeding stations. Outside feeding stations vultures were mostly feeding on cattle (47%) and sheep/goats (28%), while game species accounted for 13.1% of the food. Vultures were arriving at the feeding stations on average 53.2 hours after carcass disposal but in some cases this period was prolonged up to 12 days. Our study indicates that in habitats with high abundance of natural food (free-range livestock and game) vultures tend to actively forage and use feeding stations as supplemental sources of food, mostly during long periods of adverse weather conditions or in winter when foraging conditions are worse and natural food is less abundant.

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Standard talk

Health status and survival rates of Iberian Griffon Vultures trough GPS monitoring

Eneko Arrondo, José Antonio Sanchez-Zapata, José Antonio Donazar
Griffon vulture is the main Circumediterranean avian scavenger species, 90% of whose population concentrates in Iberia. Instead, its abundance, ecological and conservation roles of this key species are still largely unknown because of the lack of information on movement and foraging ecology. The arrival of GPS technology offers us the opportunity to deal with these issues. Between 2015 and 2017, we have tracked 65 adult individuals from two vulture populations found in the upper Ebro Valley and the Baetic Mountains. Our objective was to explore at the individual and population scale, differences in the foraging behavior and its ecological consequences; these later evaluated through the analysis of corticosterone metabolites in feathers, lead concentration in blood and overall mortality rates. We combine GPS information with accelerometer data to know where and when vultures feed. Subsequently, we verify the origin of each carcass thanks to a huge fieldwork effort visiting 11,463 feeding locations around the Iberian Peninsula. Northern birds consume mainly intensive or semi-extensive livestock carcasses (pig and sheep) while southern vultures relied on wild ungulates (most of them as result of game) and semi-extensive livestock. Consequently, northern birds had poorer health status (higher stress and lower vitamin levels) while southern birds have higher blood lead concentration. In addition, the survival of the northern population was clearly lower because of frequent accidents when the birds exploit food in heavily anthropized areas. Finally, we also ascertained that the home ranges of both populations are modeled by the legislative differences between Spain and Portugal on the treatment of cattle carcasses. Despite the large size of the Iberian griffon population, these results raise questions about the species conservation in a metapopulational scenario.

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Standard talk

Long-term simultaneous surveys and photo-identification: important tools to monitor a reintroduced bearded vulture population in a high-density scenario

Enrico Bassi, Andrea Roverselli, Alberto Pastorino, Federico Capelli, Fabiano Sartirana, Paolo Trotti, Francesca Diana, Chiara Andreola, Luca Pedrotti

In the Stelvio National Park and surroundings (northern Italy), intensive monitoring of bearded vulture (*Gypaetus barbatus*) and golden eagle (Aquila chrysaetos) populations has been carried on since 1998. Besides this, an average of 130 observers (min 40, max 199) conducted two simultaneous surveys per year (fall, winter) from 2004 to 2019 to estimate the number of floaters. Each survey lasted 5.5 h starting from 9.00 a.m., over a mean area of 1123 km2 (SD 243). All flight trajectories were recorded and ordered by age class, time and space, to quantify the minimum number of individuals. The number of breeding pairs increased from 1 (1998) to 3 (2002), till 7 in the most intensively investigated area (mean 805 km2), while the number of non-territorial floaters counted during simultaneous censuses varied from 0 to 8.5 (mean 3.4) in fall and from 0 to 12.5 (mean 3.4) in winter. The proportion of floaters to territorial adults has increased significantly over the years, with an average of 36% in fall and 29% in winter. Floaters consisted predominantly of juvenile, immature and subadult birds and sometimes adults, as already proved by first evidence deriving from photo-identification method, telemetry data, and genetics. The number of non-territorial adults is likely increasing together with the overall proportion of floaters. An effective density index, calculated by summing floaters and territorial birds, averaged 1.6 individuals/100 km2 (SD 0.5). In this high density scenario where home ranges of territorial bearded vultures largely overlap, photo-identification method of adults based on pictures searched also through social media and validated by monitoring, proved to be a powerful and cheap method to estimate home ranges of pairs at different time-scales and furthermore to optimize fieldwork differentiating breeding birds, new potential ones and floaters.

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Poster
#2

First conservation initiative on the profile of the Egyptian Vulture *Neophron percnopterus* (Aves, Accipitridae) at the Tlemcen National Park (North-West Algeria)

Haféda Benmammar-Hasnaoui and Fardi Bounaceur
Breeding migrator in Algeria, the Egyptian vulture, is one of six species of vultures threatened with extinction in Africa. At the national level, the species is protected under Executive Decree No. 12-235 of 24 May 2012 establishing the list of protected non-domestic animal species. At the international level, the species is classified as endangered according to IUCN. In Algeria, its geographical distribution covers the whole territory including the Saharan Atlas. However, sporadic surveys have been reported by amateur and forest observers to show that the raptor population appears stable and unrestrained, but no regular scientific monitoring has been undertaken for this species. In the region of Tlemcen as part of the work of our doctoral thesis on the diurnal raptors of the region of Tlemcen (North-West Algeria), the Egyptian vulture is very rare, the assessment of the five years of research shows a single localized breeding pair at the Tlemcen National Park level, specifically to the Tlemcen Mountains. With this in view and with a view to better conservation of the species and its preservation, our recent initiative in 2018 has been followed up by its reproduction and surveillance of the couple to ensure its reproductive success in these areas. natural biotopes through the installation of a feeding plot and photographic traps, and awarenes-s-raising measures were disseminated during the 2017/2018 campaign to safeguard this endangered species.

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Standard talk

How is LIFE going Under Griffon Wings? An update on the status of the Griffon Vulture (*Gyps fulvus*) population in Sardinia

Fiammetta Berlinguer, Marco Muzzeddu, Mauro Aresu, Maria Piera Giannasi, Dionigi Secci, Davide De Rosa, Alfonso Campus, Pietro Masala, Andrea Rotta

Although the population of Griffon Vulture (*Gyps fulvus*) is significantly increasing in Europe, in Italy the species is still in the Red List as Critically Endangered, with the last natural population persisting on the island of Sardinia. However, a population viability analysis (Vortex simulation software - Version 10.2.6) based on demographic data collected from 1986 to 2014 showed that Griffon Vulture population in Sardinia has a probability of extinction over 10 generations equal to 94%, and a negative stochastic growth rate (-0.0129). The simulated scenarios showed that stochastic growth rate could be significantly increased (Friedman ANOVA $P<0.001$) and turned positive by: 1) measures decreasing mortality rates in juvenile and immature birds such as food supplementation; 2) measures decreasing the frequency of poisoning events, such as the anti-poison dog units and awareness campaigns; 3) measures increasing reproductive success and productivity, such as mitigation of human disturbance in the reproductive sites; 4) measures increasing initial population size, such as restocking. The project LIFE Under Griffon Wings (LIFE14/NAT/IT/000484) started in 2015 and it is implementing the above-mentioned conservation measures. A network of feeding stations provisioned a total of 35169 kilos of biomass in 2 years, the anti-poison dog unit patrolled an area of 1147 km and obtained the first ever judicial prosecution of a large-scale poisoning incident in Sardinia, a robust communication campaign increased the awareness of the general public on Griffon Vulture conservation values, and 38 birds coming from Spain have been released with a survival rate of 87% (33/38). Following the implementation of these conservation measures, the population increased from 97-110 individuals estimated and 33 territorial pairs in 2014 to 180-203 individuals estimated and 50 territorial pairs in 2018.

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Poster
#3

Past and current use of poison baits in Albania, their effect on vultures and other wildlife species

Taulant Bino, Erald Xeka, Klea Duro, Besjana Sevo
Albania used to be an important country for European vultures with all four species being present until the beginning of 20th century. Two species of vultures, the Griffon Vulture (*Gyps fulvus*) and the Egyptian Vulture (*Neophron percnopterus*), continued to be particularly numerous up to late 1970's. The first with colonies situated in the north and south of the country while the Egyptian vulture was present almost everywhere. This situation contrasts strongly with nowadays when only the Egyptian vulture is still breeding in Albania despite a shrink from 48 territories before 2000 to only seven active territories in 2018. The large decrease of the Egyptian Vulture and the extinction as breeders of the other vulture species could relate with different factors where secondary poisoning is very likely to be the main cause. Investigations and interviews undertaken in 2018 found that poison baits, containing either strychnine or cyanide, were used by state authorities in 1975-1986\. This program, aimed at controlling large to small predators, was responsible for culling at least 260 Grey wolfs (Canis lupus). Meanwhile the research and the interviews undertaken in 2018 confirmed the current and continuous use of poison baits despite the general perception that this is an illegal activity. Herewith we explore the substances being used and the root causes of such a use in Albania aiming to provide recommendations for controlling this detrimental factor for vultures.

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Key-note

Making progress towards the conservation of sub-Saharan African vultures within the framework of the CMS Vulture MsAP

André Botha
Africa's vultures currently face a crisis. Of the nine species of vultures are resident in Africa, four are currently listed as critically endangered while another three species are endangered. André Botha was the overarching coordinator for the drafting of the Multi-species Action Plan for the Conservation of African-Eurasian Vultures during 2016-2017 and is currently responsible for the implementation of components of the Plan in sub-Sahara Africa. He will share with you some of the challenges and setbacks in the implementation of the plan in an African context but, most importantly, will share with you some of the early progress and successes that are being achieved by implementing partners to halt and reverse the decline of Africa's Vultures against sometimes seemingly insurmountable odds.

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Standard talk

GPS tracking and ground-searches for nests of the globally endangered Egyptian Vulture (*Neophron percnopterus*) reveal a large, apparently intact population in Oman

C. Bougain, I. Angelov, M. A. Schulze, C. Meyburg, B.-U. Meyburg, M. McGrady
Egyptian vulture is listed as Endangered by IUCN/BirdLife International owing to recent, extremely rapid population declines across most of its range. The large numbers of birds observed in northern Oman in winter were believed to be mainly migrants. In January 2018 we fitted 13 birds with GPS tags. 11 adults and one immature remained in Oman; only one adult crossed the Straits of Hormuz and settled in south Iran. Tracking data suggested that most of the tagged vultures held territories in 2018 and 2019. All territorial birds made regular, sometimes daily, visits to anthropogenic dumpsites that were up to 47 km away. During the circa 11 months of tracking in 2018, birds visited the two main dumpsites up to 317 times. Home range sizes (95% kernels) were variable and affected by distance to dumpsites; core home ranges (50% kernels) were less variable. In spring 2019, we attempted to visit the presumed territories occupied by telemetered birds, confirm their breeding status, and search for others. We found more than 80 apparently occupied territories which, added to those discovered on Masirah Island, exceed the published national estimate of 100 pairs. Our survey work occurred mostly within 40 km of the main Muscat dumpsite, which is only a small amount of the potential nesting habitat in Oman. An initial rough, yet conservative estimate based on the availability of suitable nesting habitat suggests a breeding density of 0.26 pairs/km^2 in our study area, and that it holds around 240 pairs. Although the nesting density across suitable habitat appears to be variable, the number of pairs of Egyptian vultures in Oman is multiple times greater than estimated. This runs counter to its global conservation status, and suggests that under certain conditions Egyptian vultures can thrive, even in places where anthropogenic development is rapidly increasing.

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Standard talk

Coordinating a regional response to the Asian Vulture Crisis, including the creation of the 'SAVE' consortium, with updates on where things stand

Chris Bowden
There have been very few more dramatic, fast and wide scale species declines than those of South Asian vulture populations since the 1990s. The formerly most abundant of these across the region, the white-rumped vulture *Gyps bengalensis*, declined by 99.9% over less than 20 years. The main cause was shown to have been the veterinary drug diclofenac which was being widely used to treat cattle, and which proved to be lethal to vultures feeding on cattle carcasses that had been treated shortly before death. Three priority actions were identified as urgently required in order to prevent the total extinction of at least three endemic species: Removal (through effective banning) of the veterinary drug, the identification of safe alternatives, and the establishment of captive populations for later reintroduction back to the wild. But several challenges meant that instigating a sufficiently quick and coordinated approach was not something that would happen automatically. The fact that detecting the drug in dead vultures requires very sophisticated and sensitive testing, the vultures live long enough after ingestion, that they die well dispersed away from the toxic carcass – all of which means that only through rigorous scientific analysis could the correct conclusions regarding the main cause be made. International boundaries and restrictions regarding the transport and export of samples further added to the challenge. Speedy rigorous scientific publication in peer-reviewed journals was a key step, and the engagement of in-country scientists and institutions was essential. Ongoing rigorous scientific inputs was also important, and then the communications of these (including collection and analysis and writing up of monitoring work both for vultures and the drugs concerned) led to Government attention and key legislative changes (ie bans of veterinary diclofenac). Having some demonstration focus to the work has been helpful (in terms of holding captive stock), but even with all these aspects covered, there was still a need to develop a recognised consortium of partners that deliver consistent messages and maintain credibility for these messages to be taken seriously by respective governments. In February 2011, seven years after the diagnosis of the main diclofenac problem (although other veterinary drugs had meanwhile emerged as also being problematic), a consortium of 14 partners from across the region signed up to work together under the banner 'Saving Asia's' Vultures from Extinction' (SAVE), and these meet and report annually. The partnership has since grown to 23 organisations and extended to include Myanmar and Cambodia as well as South Asia. The effect has certainly been positive, and the mechanisms of setting up SAVE are presented. Partners are mainly NGOS but also include several key government institutions from the range states. A separate multi--lateral governmental committee was also created soon after the formation of SAVE, in 2012, and provides a further forum for agreed priority actions to be taken up at higher levels. The combined effect is a significant degree of coordination regarding the key steps required (an annually updated list, as well as a Blueprint Regional Vulture Recovery Plan to 2025), and the Blueprint has effectively been incorporated to the Convention of Migratory Species Mul-

ti-Species Action Plan, which was adopted in 2017. Several significant steps and progress have been achieved, including reductions in diclofenac use, particularly in Nepal, where the first releases are taking place from conservation breeding programmes. The development of Vulture Safe Zones has been another important development, and safety-testing of veterinary drugs is a major focus in India. Nevertheless, a number of challenges remain, and the release of birds back to the wild (especially in India) offers a high-profile opportunity to engage and attract support more widely, and to publically test the safety of the environment for releases and the potential recovery of the species in the wild.

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Standard talk

Vultures and wind energy, is a balance possible? A worldwide perspective

Alvaro Camiña
Wind energy is developing worldwide, with 591,549 MW installed. We studied the impact of wind energy in different Spanish regions and also worldwide in the Old (India, South Africa and Kenya), and new World (Latin America). Studies from Spain show that around 1,000 Eurasian griffons *Gyps fulvus* collide with turbines per year. Differences relate with wind project locations (migratory versus resident areas), distribution of food resources and environmental changes over time. We analysed Cinereous *Aegypius monachus* and the Egyptian *Neophron percnopterus* vulture fatalities. Central Spain (Avila and Guadalajara provinces) and the Strait of Gibraltar are respectively key sites of conservation concern. No Bearded vulture has been recorded yet. Information from other European countries is scarce, probably because of the lack of many wind farms in vulture areas. In Africa only the Cape Griffon Gyps coprotheres has suffered collisions (nine over six years) but none have been recorded for any of the remaining African species there. In India, there is one case of a Cinereous vulture and again, no other species has been recorded. Fatalities exist for the Red and Yellow headed Cathartes aura and C. burrovianus and Turkey vultures *Coragyps atratus*. Even some projects have been developed near the Andean Vultur gryphus and California *Gymnogyps californianus* condor ranges. The mitigation hierarchy should help to minimize and balance biodiversity conservation and wind development. We discuss the efficiency of avoidance, mitigation and compensation measures and the international criteria applied. We show real mitigation examples through intervention in the wind farm (shut-down on demand, radar, and blade painting or bladeless turbines). Wind energy interacts with many other human activities so impacts could require a broader scenario involving many other stakeholders. There is a need of a long-term post-construction monitoring that helps to identify the fatality trends over time and adopt an adaptive management.

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Standard talk

Origin of lead and saturnism risks for Bearded Vultures in the French Alps

Ilka Champly, Rafael Mateo
Lead is a highly toxic poison that affects most body systems and unlike many other trace metals it has no physiological function and thus no benefit to living organisms. In large raptor species lead poisoning or saturnism is recognized as a major threat. Hunting ammunition has been shown to be a principle source whilst environmental contamination may play a local role. Bearded Vultures can be exposed to lead from ammunition as occurs with other scavengers. Our study aimed at identifying the different lead sources in the project area Life GypHelp and at evaluating the importance of lead intoxication risks for bearded vultures in the French Alps. Moreover, it was expected to better precise the lead poisoning risk dimension from different sources in the project area allowing the elaboration of an action plan in order to reduce lead poisoning risks for bearded vultures in collaboration with all stakeholders. In order to perform a risk assessment of lead ammunition on the conservation of bearded vultures in the French Alps, we considered necessary to know the contribution of the different sources and routes of their Pb exposure, like soil ingestion during soil bathing, soil ingestion during feeding, bone consumption, soft tissues consumption and fragments of Pb bullets or Pb shot pellets. In addition to the estimated exposures through these sources, we could also confirm the contribution of different sources by the analysis of stable Pb isotopes present in these sources compared with the signature accumulated by bearded vultures. As a main result, bearded vulture feather analyses indicated that 15% of birds in the population are abnormally exposed to lead (prevalence) and 30% of birds would be highly exposed to lead per year in the French Alps (annual incidence) which means affected at sub-lethal levels and in some cases lethally poisoned.

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Speedy talk

Vultures are under severe decline in Morocco

Sidi Imad Cherkaoui and *Asmae Essabbani*
Three vulture species are currently breeding in Morocco: Bearded Vulture, Egyptian Vulture and Griffon Vulture. Two still breed in the country (Bearded Vulture and Egyptian Vulture) while no breeding proof of the Griffon vultures was provided during the past two decades. 2 more species are considered as 'former breeders' and now extinct in the whole Maghreb region (Cinereous Vulture and Lappet-faced Vulture), and finally more 3 species are rare accidental visitors from sub-Saharan Africa (Hooded Vulture, White-backed Vulture and Rüppell's Vulture). The nesting populations of the three species have a very restricted range and breeding pairs are estimated to be less than 10 pairs each which qualify them as critically endangered in the country by using IUCN criteria nationally. There is a considerable lack of information about the Egyptian Vulture and most other vulture species in recent decades and their current status is not well known. Different human-driven threats affect vultures' populations and jeopardize their existence in the country such us poisoning and disturbance

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Standard talk

Exposure of Griffon Vultures (*Gyps fulvus*) in north Israel to environmental contaminants and possible effects on breeding success

Yael Choresh, Emilie M. Hardy, Paul Palazzi, Charline Schaeffer,Omer Yaffe, Tamar Trop, Ido Izhaki, Brice Appenzeller, Dan Malkinson

The population of the Eurasian Griffon Vulture at Gamla Nature Reserve in north Israel has declined by almost 90% during 1998-2017. In addition, the average breeding success there is lower than 30%, as opposed to 70% on average in European countries. We assumed that the vultures at Gamla may be exposed to sub-lethal factors such as endocrine disrupting chemicals (EDCs) in higher levels than those in Europe. These chemicals do not directly induce mortality, as acute poisoning does, but rather may impair fitness by disrupting reproduction, and may be one of the causes for low breeding success. To test this assumption, 132 naturally shed flight feathers were collected from five European countries and three sites in Israel, during 2014-2017. We used GC-MS/MS and LC-MS/MS for a comparative analysis of over 150 contaminants, 19 were known EDCs and 10 were veterinary nonsteroidal anti-inflammatory drugs (NSAIDs). The analysis revealed a distinct chemical footprint of contaminants for each country, and for the three geographic regions within Israel. All the EDCs levels found in feathers collected in Israel such as Diuron and Carbaryl were higher than the European colonies in all contaminants but one (PCP). However, NSAIDs levels found in feathers collected in Israel, such as Diclofenac and Ibuprofen, were lower than those found in feathers collected in Europe. The massive presence of contaminants in the feathers collected in Israel shows that the exposure is vast and ongoing. Such an exposure may be associated with low breeding success and population decline. This study also shows that the Griffon vulture, which has an extensive distribution range, is a suitable species for biomonitoring environmental contaminants across countries. We hope that the results may raise the awareness to the idea that sub-lethal factors should be considered in the actions taken to mitigate the species decline.

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Standard talk

Integrating vulture ecology, conservation biology and stakeholders' perception

Ainara Cortés-Avizanda
Vultures are among the studied vertebrate species worldwide in part due to their historical "alliance" with humans. Because of that, substantial progress has been made in the understanding about these avian scavengers. In fact, there are numerous ecological studies based mainly on their biology, behavior and their role within ecosystems. In addition, a lot of time and effort has been invested to implement precise conservation initiatives to preserve these species worldwide. In this sense, most policies have focused on reducing the main limiting factors for the viability of vulture populations. For instance, poisoning, persecution, habitat destruction, or the concentrations of antibiotic residues in their systems, and the reduced availability of food and the loss of traditional agricultural practices are among the main concerns of the abrupt collapse suffered globally. However, a key piece that has been ignored to date is the human dimension and in particular the human perception towards vultures. In this talk, I will present an overview of the different ecological issues, main conservation actions that we have worked with vultures to date and how perceptions can be the new approach to achieve the preservation of these species worldwide.

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Poster
#4

Ecological consequences and socioeconomic implications of the arrival of Griffon Vultures to Mallorca: presentation of a novel project

Ainara Cortés-Avizanda, Ana Sanz-Aguilar, Jordi Muntaner, Marta Serra, Andreu Rotger, José Manuel Igual, Giacomo Tavecchia

The colonization of Mallorca by the griffon vulture (*Gyps fulvus*) was an extraordinary event. It took place in 2008 and the population was successfully established. From an ecological point of view, this is a unique event to study how the arrival of a large carrion eater may shape the local scavenger community. From the conservation point of view, the project allows examining how perceptions towards threatened species are developed by different stakeholders. Finally, the main goals of this project will favor the implementation of optimal guidelines. Here we aim to present the main goals of the project and the preliminary results found.

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Poster
#5

Fight Against illegal Poison: from causes to judicial process

Alnouri, Osama
Fight Against illegal Poison: from causes to judicial process
Julieta Costa, Alice Gama, Joaquim Teodósio, Rui Machado
This work has been carried out during LIFE Rupis project. We started the project with the creation of a new dog-team, specialized in poison research in the field. We have been dealing with almost a dozen cases by year, since police forces started to actively patrol areas and have found quite a lot of evidence of poison, either in domestic animals or wild ones, specially raptors. Most poisonings seem to happen by purpose, using illegal substances: strychnine, carbofuran and carbamate. A few might have happened accidentally (metiocarbe, rodenticide). Either they attributed to predator-control or seem to be due to social conflicts. We do not know if vultures are targets, themselves, since popular stories running in the local communities include predation of calves by griffon vultures; directly or indirectly vultures are common victims of poisoning, having caused the death of at least one breeding pair of Egyptian-Vulture. A Protocol developed in the project has been set in place, which states what and how to do, from police forces to veterinarians and toxicology professionals and that have eased the handling of the casualties, with some learning from all actors; linking the chain and encourage communication between compartments was one of the most valuable lessons taken and the key for an efficient recovering of cases. The main challenge now is the follow-up of judicial processes across judicial enquiries and the building up of evidence, so as to achieve the trial phase.

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Standard talk

25 years of illegal poisoning in Spain

David de la Bodega Zugasti, Carlos Cano
In 2016 SEO/BirdLife and WWF published a report on the evolution of illegal fauna poisoning between 1992 and 2013. Here we present an update of the available information from the regional governments in Spain including all the data obtained from all cases investigated. We analyse the tendencies of the last five years (2013-2018) in relationship to the previous 20, giving a long-term dynamic view of the products, motivations and affected species. We also consider the efficiency of measures taken against illegal poisoning (training, canine units, strategies,...) along the last 25 years. Although not intentionally targeted, vultures are among the most seriously concerned species.

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Standard talk

National census of vultures in Spain in 2017-2018

Juan Carlos del Moral and Blas Molina
The Black Vulture in Spain in 2017 counts with 43 colonies and 6 isolated couples, summing up to 2,544 pairs. We estimated a population of 2,544-3,140 pairs. They are spread over 7 Autonomous Communities and 14 provinces. The nesting area of the Black Vulture is limited to the southwestern of the Iberian Peninsula and north of the Balearic Islands, as was the case until very recently. The reintroduction work of the species in Catalonia has been successful and there is a new and small breeding point in Lleida. There are estimates of the population since the 1970s, these estimates reflect a constant increase since the beginning. In the last decade the increase at the national level is 30.57%. The Griffon Vulture in Spain in 2018 counts with 2,544 colonies and 533 isolated couples, summing up to 3,077 breeding points. The population is 30,946-37,134 couples (95,930-122,542 copies). There are five national censuses, made every 10 years. In the last decade a positive trend is obtained with a growth of 17.5%, which is lower than the increase in previous decades (29.3% in 1998-2018, 55.4% in 1988- 2008 and 48.2% in 1978-1988). Although the population increases in general, there are registering declines in reproductive parameters with respect to previous censuses. The population of Egyptian Vulture in Spain in 2018 is 1,490-1,567 pairs. The general trend obtained is slightly positive respect to the previous national census. 38 new safe territories have been detected compared to 2008 and only 11 more if the comparison is made considered probable and safe territories. In the previous decade (1998-2008) there was an increase of 10%. In this situation, we could speak of a very slight and possibly constant increase in recent decades. Despite this general increase, it is important to note that there was a decline in 17 regional areas, that the population of other 16 are stable and in the remaining 17 the population has increased.

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Poster
#6

Griffon Vulture population trend and size in the Eastern Rhodopes at the crossroads to Asia

Dobromir Dobrev, Volen Arkumarev, Theodora Skartsi, Anton Stamenov, Elzbieta Kret
Studying the demography of raptors populations is an essential part of the conservation process and is compulsory for understanding the population dynamics of this guild of bird species. The Eurasian Griffon vulture (*Gyps fulvus*) is an obligate scavenger feeding on carrion and having a key role in ecosystems functioning. It was one of the most abundant vulture species breeding in Europe and on the Balkans in the past. The Eastern Rhodopes hold one of the few viable and increasing populations of the species on the Balkans nowadays. We studied the Griffon vulture population size and trend during 2016 – 2018. Within the species breeding season we visited all active and historically occupied sites in the study area to register the number of pairs and the breeding rates of the species. Additionally, we surveyed the population size and structure in the pre-breeding period at the roosting sites. The population increased from 88 pairs in 2016 to 100 pairs in 2018. The annual population growth rate is 6±3.6 pairs. The number of occupied cliffs by pairs was 16 in the first year of the study and reached 21 in the last one with 279 occupied nests for the whole study period. Overall, 227 breeding attempts were registered in the study area. As a result, 175 chicks fledged successfully. The breeding success of the species population in the Eastern Rhodopes is one of the highest recorded across Europe - 0.77±0.02. In 2016 a total of 196 vultures were registered in the pre-breeding season and 209 in 2018. Adult birds predominated and comprised 58% of all individuals. The Griffon Vulture breeding population in the cross border area of the Eastern Rhodopes is slowly recovering and has to be considered as inseparable ecological unit with permanent exchanges and movements of pairs among different breeding colonies.

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Standard talk

Restocking the Egyptian Vulture in the Balkans – preliminary results

Vladimir Dobrev, Volen Arkumarev, Hristina Hristova, Polina Hristova, Emil Yordanov, Yordanka Vasileva, Rusko Petrov, Ivaylo Klisurov, Steffen Oppel and Stoyan C. Nikolov
The Egyptian Vulture is the most threatened and the only long-distance migrant amongst the four species of European vultures. Its Balkan population has declined with 80% over the last 30 years and currently consists of less than 70 pairs. The major threats such as poisoning, illegal killing, electrocution with energy infrastructure, as well as natural barriers (such as the Mediterranean Sea) for the juveniles, permanently cause high mortality. It was speculated that the Balkan population may extinct in few decades if no substantial change in its management is undertaken. To avoid extinction of the population in the near future, considering the large magnitude of the treats along the flyway, we piloted an experimental restocking program in Bulgaria, the stronghold of the species in the region. As a first step we test three different release techniques in order to establish the most efficient method among delayed release, fostering and hacking of captive-bred individuals. We set criterias to measure the success of each method over a period of 5 years. Under the delayed release method we released 4 birds in 2018\. According to the criteria for success the delayed release was successful in its first year of implementation as all four released individuals adapted successfully to the wild and completed their first migration successfully. The fostering was applied with 1 bird and even though the bird died in Africa we consider the method successful as the bird was accepted by the wild parents, fledged, adapted well and survived the first migration. We released 2 captive-bred individuals through hacking but both birds failed on different stages of adaptation and we considered this technique unsuccessful in 2018\. Based on the results from the first year we gave reccomendations for the implementation of the restocking program in 2019.

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Standard talk

The role of sanitary policies for carcass management on farmers' perceptions toward vultures in a transboundary context

Fátima Domínguez Gigante, João P.V. Santos, José Vicente López-Bao, Pedro P. Olea, Patricia Mateo-Tomás

The outbreak of the "mad cows' disease" led to the prohibition of abandoning livestock carcasses in the European countryside to fight against disease spreading. Its negative consequences for scavengers fuelled several modifications of the sanitary policies, up to the enforcement of Regulations CE/1069/2009 and EU/142/2011, allowing the designation of Scavenger Feeding Zones (SFZs) where livestock carcasses could be disposed to feed scavengers. However, these regulations have been unevenly implemented across Member States: e.g. while Portugal has not designated SFZs, Spain has transposed this EU regulation into national and sub-national contexts. This is an example of two neighbouring countries with completely opposite application of the same regulation. Beyond impacts of the uneven implementation of sanitary regulations on species conservation, few information is available on their impacts on farmers perceptions toward scavengers. Taking advantage of a transboundary context in the Duero valley, we carried out 109 semi-structured interviews (61 in Portugal and 48 in Spain) in 2019. Our results showed contrasting perceptions between farmers from both countries towards some scavenger species. Spanish farmers showed more negative perceptions towards griffon *Gyps fulvus* and cinereous *Aegypius monachus* vultures (that considered harmful because of their attacks to livestock), than Portuguese farmers (who considered vultures beneficial because they depleted carcasses). However, neither legislation knowledge nor compliance explained the observed differences, what could be due to a scarce knowledge on the current regulations by farmers (only 10.1% known the regulations). Perception differences were consistent with uneven carcass management, i.e. 95.8% of Spanish farmers collected carcasses and 27.9% of Portuguese farmers left carcass in situ. Our findings suggest that the lack of effective enforcement of EU sanitary regulations may result in transboundary differences in farmer perceptions towards scavengers, which can in turn promote human-wildlife conflicts. Scavengers' conservation needs both transboundary implementation efforts and on-ground work with local farmers.

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Key-Note

Flight and foraging decision making in Griffon Vultures

Olivier Duriez
Griffon vultures *Gyps fulvus* are obligate scavengers, facing many constraints while foraging. Their morphology constrains them to use soaring-gliding flight, dependant on local atmospheric conditions. They must search over large areas for carcasses, which are rather unpredictable in time and/or space, even if available at supplementary feeding stations. I review the latest discoveries how vultures cope with these multiple trade-offs, by analysing movement tracks and flight behaviour of individuals tracked by GPS telemetry and accelerometry in France. First using captive birds trained to fly freely with falconry techniques, we quantified energy expenditure in flight and on the ground (calibrating accelerometer with heart rate), and the use of thermals (trade-off of choosing the right bank angle to optimise climb rate). These experiments help understanding the behaviour of wild vultures. Second we investigated how food predictability and breeding status would affect foraging decisions by comparing vulture behaviour in regions with and without feeding stations (Causses and Pyrenees in France). The flight parameters (time of departure from the roost, daily distance travelled, duration of flight bouts) were strongly influenced by wind and availability of thermal uplifts. Compared to non-breeders, individuals breeding in regions with more feeding stations spent more time flying per day, and also more time feeding when on the ground. Our results suggest that the breeding status of the individual, the seasonality of the availability of food resources, and the atmospheric conditions influence movement patterns and time and energy prioritization during flight. Finally we studied how supplementary feeding may induce foraging routines and periodically stereotyped foraging behaviour. In conclusion, griffon vultures remained opportunistic scavengers, even in highly anthropized landscape with many feeding stations, still finding carcasses at random, and optimizing their foraging behaviour with local aerological conditions, in order to save energy.

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Standard talk

What affects the survival probability of reintroduced Griffon Vultures in Israel?

Ron Efrat, Ohad Hatzofe, Oded Berger-Tal
Israel's population of Griffon Vultures (*Gyps fulvus*) declined dramatically in the past 100 years. Today, only ca. 50 pairs of these vultures breed in Israel, hence the species' local population is considered Critically Endangered. In order to stop this decline, and because the reintroduction of individuals from nearby populations is impossible in Israel, a captive--breeding program was established in 1989. Since 1993, more than 150 captive-bred birds were released: some reintroduced to an area where the species was extinct as a breeder and others reinforced a colony on the verge of extinction. To monitor the success of this program, released vultures are tagged with a unique color ring and since 2007 also with a wing tag; both are readable from a distance. These individual markings led to over 5,700 observations of reintroduced vultures reported since 1996 throughout Israel. We used these observations to study the factors affecting the success of Griffon Vultures' reintroduction in Israel. In this talk I will present the first results of our study which aims to assess the effects of different captive breeding and release protocols on survival of reintroduced vultures. We found that annual survival is strongly affected by the release site, release season and rearing method: hand vs. parental rearing. Additionally, we found that birds' survival rates are lower during their first year after release compared to all other years, and that releasing the birds at an older age positively affects their survival. Our results present a first and important glance at the potential that such a long-term database holds for the study and improvement of Griffon vultures' reintroduction in Israel.

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Key-note

What can wildlife crime analysis do for vulture conservation?

Iñigo Fajardo
Crime analysis is a conventional tool for crime solving and law reinforcement. However, so far in Europe it is poorly or not implemented in wildlife conservation. Poisoning and shooting are frequent causes of vulture deaths -and local extinction too- but contrarily, very few episodes investigated by European police bodies end up in court convictions, despite categorized as crime in most European Penal Codes. This presentation will show what wildlife crime analysis is and how it can help in vulture conservation, especially for populations of endangered species or in critical situations locally.

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Speedy talk

Long-term recovery of vulture populations: insights from Gipuzkoa (N Spain)

Tomás Aierbe, Paz Azkona, Haritz Beñaran, José María Fernández-García, Carmelo Fernández, Aitor Lekuona, Íñigo Mendiola, Mikel Olano, Jon Ugarte, Javier Vázquez
The populations of Griffon, Egyptian and Bearded vultures have been monitored in Gipuzkoa (1,995 km2) since the late 1970's. Census of colonies and occupied territories, and collection of reproductive output, have been performed regularly, applying the same field methods by the same team, thus generating a complete and reliable data-series. Although a known breeder in the study area during the 19th century, the Griffon Vulture became virtually extirpated around 1960-1970, and the first breeding evidence was found again in 1980\. The number of pairs increased slightly up to 1994, showing a steady positive rate afterwards (ryear=7.1; 271 pairs in 2018), based primarily on the densification of the traditional colonies. The colonization of new breeding sites has been a less marked process. From low numbers in the 1980's, the number of territories of the Egyptian Vulture increased during the 2000's and has remained stable since (12 in 2018). Productivity and breeding success have been higher than those published for neighbour populations. As for the Bearded Vulture, lone birds have set temporal territories, but no reproductive unit was stablished until 2017, this being the first out of the Pyrennes not related to reintroduction programmes. In the framework of the project POCTEFA Ecogyp, research on demography and spatial ecology has been launched recently. Overall, both Griffon and Egyptian vulture populations seem to have low annual adult mortality (3-11 % for the Griffon). Griffon vulture individuals apparently have smaller ranges than in other populations, which is possibly associated to the persistence and abundance of sheep, horses and livestock in the mountain pasturelands throughout the year. These factors could explain the long-term recovery of the populations. In particular, still there is no indication of saturation for the Griffon Vulture breeding populations.

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Poster
#7

Life Egyptian Vulture (www.lifegyptian.it) A chance to save the Egyptian Vulture on the Italian mainland

Alessandro Andreotti, Arianna Aradis, Guido Ceccolini; Anna Cenerini, Antonio Luca Conte, Andrea Ferri, Mariangela Francione, STORCAL, Matteo Visceglia

In Italy, the population of the Egyptian vulture experienced a dramatic decline during the last century. Its breeding range, once extended along the Tyrrhenian and Ionian coasts, the Gargano peninsula and Sicily, is now restricted to central-western Sicily and the Ionian inland. In Sicily, where 8-10 pairs are still breeding, conservation actions have been promoted since 2016 in the framework of the LIFE Project Con.Ra.Si. Two years later,the LIFE Project Egyptian vulture was launched, to assure the persistence of the species on the Italian mainland. Here, during the 2018 breeding season, the presence of only two pairs was ascertained, beside some not-breeding individuals.
The LIFE Project Egyptian vulture is currently promoting actions to reduce human induced mortality and increase the number of birds in the Ionian inland. Actions are ongoing to prevent disturbance at the breeding sites and to strengthen the activity of anti-poisoning dog units. A plan to secure dangerous power-lines in the breeding areas is underway, and a supplementary feeding programme was launched to reduce the risk of poisoning both in the breeding areas and in the main stopover site in western Sicily. Furthermore, a restocking programme has been supported. The captive stock of Egyptian vultures managed by CERM Centro Rapaci Minacciati is currently rearing young to be released into the wild. In 2018, 7 birds were produced, two of which were freed through the hacking methods. The other birds were kept in captivity for being released in the following years. Both the released young did migrate following the right route, but one was shot in western Sicily, while the second one died in Tunisia soon after crossing the Sicilian Channel, probably because of a poisoned bite. To tackle the illegal killing of birds in west Sicily, an anti-poaching camp is going to be promoted.

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Speedy talk

How do juvenile Bearded Vultures use supplementary feeding stations?

Ruth García-Jiménez, Simon Benhamou, Juan Manuel Pérez-García, José María Martínez--González, Antoni Margalida, Olivier Duriez

Supplementary feeding stations (SFS) have long been implemented as one of the most helpful anthropic tools to sustain conservation programs. Over last decade, a critical scientific view has discussed their effects on the behavioural ecology and conservation of avian scavengers. Its possible role as an ecological trap have been already described for the obligate scavenger species, who have evolved for searching for unforeseeable feeding sources in both spatial and temporal scales. Here, we test the impact that these SFS could have on the post-fledging period of an endangered vulture species, the Bearded Vulture *Gypaetus barbatus*. We analysed some factors influencing the species behavior according to the origin of the birds (reintroduced vs wild individuals), the specific SFS management, concerning both temporally and spatially food predictability, and other environmental factors. To assess a possible routine behavior of the species with respect to the SFS, we analysed a total of 18 tracks made by juveniles, including 7 individuals reintroduced in France (Central Massif, Corse and Alps), and 9 wildborn individuals from Spain and France (Pyrenees and Alps), GPS-recorded for 3 months (from August to October) at a rate of 1 location every 5 minutes. Reintroduced individuals seem to be more attached to the specific SFS at which they were accustomed to be fed during the hacking process than the wildborn individuals are attached to the closest SFS to their nest. Furthermore, we expect that birds foraging periodically at SFS are more prone to develop routine behaviours than those surrounded by more randomly managed feeding points. Considering the existing reintroduction programs aimed to restore Bearded Vulture populations, a deep comparative analysis in terms of the differential space use between reintroduced and wild individuals regarding the use of SFS should be extremely useful to address and optimize future conservation and management measures. Data origin: Spanish telemetry data sit on the ECOGYP EFA 089/15 project, INTERREG V - A - España - Francia -Andorra (POCTEFA 2014 - 2020) program, and French telemetry data are collected as part of the National Action plan, under the ringing licence of Olivier Duriez (PP961 from CRBPO).

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Standard talk

Conservation through the spatial ecology of the Canarian Egyptian Vulture

Marina García-Alfonso, David Serrano, José Antonio Donázar
Vultures are common targets of conservation actions since they are threatened worldwide. Hence, scientific evaluation of main risks and mortality causes, factors limiting population as well as associated vultures behaviour is essential. Intending to improve management and conservation measures to ensure vultures' survival, we are deepening on the spatial ecology of Egyptian Vultures (*Neophron percnopterus*) on the Canary Islands. This globally endangered species is a great example of successful conservation programs supported by a long-term monitoring project and scientific research. The study system consists of a non-migratory population bulked mainly on an island where it is the only vulture species present. Currently, we continue with population monitoring begun in 1998, and we have incorporated high-resolution GPS technology. Between 2013 and 2019 a total of 52 vultures have been tagged, collecting about 29 millions of locations. To the date, we have used this unprecedented information to explore drivers of foraging on farms, farmers' perception about vultures, differential use of resource according to their predictability, and risk of accidents on power lines based on their use by vultures. This is shedding light on the importance of considering the differential behaviour of different population fractions on designing management and conservation measures.

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Standard talk

First study of the juvenile dispersion of the Cinereous Vulture (*Aegypius monachus*) in Portugal.

Alfonso Godino, Otilia Urbano, Sérgio Saldanha, Laurie Goodrich, Keith L. Bildstein
The cinereous vulture (*Aegypius monachus*) is Critically Endangered in Portugal. After the extinction as a breeding species in this country during the 1970´s, a few pairs started to breed again in Tejo International National Park in 2010. After almost a decade of nesting, no studies had been implemented in this colony with the exception of the annual breeding population census. Due to a lack of information, a project was launched in 2018 with the goal to study the juvenile dispersion and to identify the threats affecting to this group of the population. All the nestlings in the colony were equipped with GPS-GSM transmitters (n=8), six of them tagged in the nest and other two tagged after rehabilitation in a wildlife rescue centre (one was injured from the collapse of the nest and the second one taken after evidence of starvation) but both were released healthy later and tagged before release. Movements of all birds during the first year of tracking were mainly in the colony and surroundings, with some excursions 80-100 km away from the colony. During this period, two vultures were found dead close to the colony just few weeks after leave the nest, one in Portugal and the second one in Spain. Necropsy of these two birds did not show any clear cause of death. A third vulture was found injured in 2019 with a wing luxation, due probably to a collision with a power line 70 km SW of the colony. Blood and feathers samples were collected to detect the presence of heavy metals and veterinary drugs with low or no exposure to these contaminants found. Due to the low numbers of birds studied to-date, another eight nestlings will be tagged in this colony in 2019. This project was supported by the Hawk Mountain Sanctuary, ENDESA and the Tejo Internacional N.P.-ICNF, IP.

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Poster
#8

Supplementary feeding stations as a tool for the conservation of endangered avian scavengers: Monitoring and new strategies

Iván Gutiérrez, João Santos, Américo Guedes, Miguel Nóvoa, José Pereira
In recent years, supplementary feeding stations have become a key tool for the conservation of avian scavengers by increasing food availability and ensuring food free from poisons and other toxic substances. However, the efficiency of those stations and feeding protocols can be influenced by several factors (e.g. amount and type of food supplied, period and frequency of food depositions, distance from nesting sites and environmental conditions). Understanding the temporal patterns of use of the feeding stations by avian scavengers as well as their feeding habits is therefore crucial for designing improved supplementary feeding protocols and effective conservation strategies. During 2017-2018, we monitored the feeding habits and activity patterns of Egyptian vultures (*Neophron percnopterus*; EVs) and other avian scavengers by using motion-triggered cameras in two feeding stations located in the cross-border region of the Douro valley (Northwestern Iberia), as part of the project LIFE Rupis (LIFE14NAT/PT/000855). The relationship between the number of birds and biomass provided was analysed, as well as the use of the feeding stations during the spring-summer months. Strategies targeted to improve the supplementary feeding and breeding success of EVs in the area were also implemented. This included the use of frozen quails and food depositions in the early morning for favouring the feeding of this species and the use of sheep wool for providing nest material. The number of EVs was positively correlated with the biomass provided and a trend for a higher number of individuals in the feeding stations was observed in June-July. Moreover, the new strategies implemented seem to be working for improving the feeding and breeding success of EVs, however further research is needed to prove its effectiveness. This study can contribute to improve specific supplementary feeding protocols in feeding stations and help in the management and conservation of endangered populations of avian scavengers.

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Standard talk

Location-aware alert system for wildlife poisoning using GPS tagged

Ohad Hatzofe, Gal Vine
Despite considerable effort and partial success, the Griffon Vulture (*Gyps fulvus*) population in Israel has dropped from hundreds of nesting pairs to ca. 50 pairs in 60 years. The main causes for this decline are: poisoning by illegal use of pesticides, electrocution, disturbance, persecution, lead and veterinary drugs poisoning. While electrocution was reduced dramatically and disturbances and exposure to veterinary drugs are better controlled, poisoning remains the main threat. In most cases, poisoning events are discovered incidentally only after intoxicated animals are found. Thus, it is too late to save them as well as to prosecute or deter offenders. It is almost impossible to perform early detection and to prevent the exposure of vultures to poison baits or lead poisoned wild animals, shot for game or culled or livestock treated with dangerous drugs as NSAID. In response to the critical status of the Griffon vulture population in Israel, we have built a location-aware alert system integrated with modern GPS-loggers, which allow automatic analysis of vultures' movements in near real-time, using location, altitude, body temperature and speed. The system produces automated alerts, e.g. landing, lack of movement, for each transmitter-carrying individual by analysing information of body temperature, site topography, group size and geofence of highly poisoning-prone zones. The alerts are automatically directed to the relevant regional rangers' mobile phone according to the individual's location, enabling fast on-ground response and preventing potential poisonings. Identifying vultures' landings near carcasses support the INPA's sanitation program which includes the removal of livestock carcasses in order to reduce the carrying capacity for the overpopulation of canids, which leads for poisoning. This project demonstrates the potential of using transmitter-carrying wildlife for the real-time management of endangered species populations by combating poisoning or other mortality factors such as persecution.

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Standard talk

GPS tracking in vulture conservation: science, surveillance and communication

Daniel Hegglin
Satellite tracking has become an important tool in conservation biology in recent decades. Ever smaller, more powerful and less expensive systems contribute to the exponential growth of the number of animals marked with transmitters. Especially for vultures, the use of satellite transmitters is very attractive. Thanks to their size and their long gliding flights, relatively large, solar powered trackers can be used, which record the spatial behaviour of vultures in very high resolution. As different examples illustrate this technology provides valuable contributions for three important fields in conservation: science, surveillance and communication. Scientific analyses of the extensive data sets enable the development of effective conservation strategies. Further, GPS tracking allows quick location of animals that are no longer mobile. Prerequisites are that suspicious sensor data is detected promptly (ideally with the help of location-independently data transmission and automated alarm systems) and that professional field checks are immediately initiated. This way weakened animals can be rescued or causes of mortality can be identified before the decomposition process restricts such analyses. Finally, satellite tracking offers valuable possibilities for communication. Attractive information on the spatial behaviour and on the fate of single individuals opens unique opportunities to win over a broad public for the conservation of the species. In addition, the knowledge about the continuous surveillance of animals can deter poachers. With all these possibilities, it should not be forgotten that satellite telemetry also involves considerable risks and inadequate tags and not properly adjusted harnesses entail major risks both for the animals and for the reputation of conservation projects. In view of these risks, it is important that this technology is used very carefully and that it is evaluated in advance how satellite tracking can be optimally used for conservation in the fields of science, surveillance and communication.

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Standard talk

Genetics as an invisible layer of information to evaluate and improve reintroduction strategies

Philippe Helsen, Sylvain Henriquet, Marleen Huyghe, Christian Tessier, Lea Giraud, Olivier Duriez, Francois Sarrazin
Demographic parameters are of utmost importance in describing population trends and probabilities of extinctions leaving insights from genetic sources largely untouched. Apart from their conceptual use to preserve long-term adaptability, genetics has recently proven its use in deciphering processes that remain poorly understood, such as reintroductions for which success rates remain low. Here we describe how genetic research increases our comprehension on factors contributing to the success of reintroduction projects with a special focus on the restoration of Cinereous Vultures (*Aegypius monachus*) in France led by LPO France, LPO PACA and Vautours en Baronnies. Aiming to restore historic connectivity and ecosystem services, Vultures originating from both Spanish rehabilitation centres and breeding facilities have been reintroduced in France. Post-release monitoring as well as screening of wild born individuals enabled us to test whether reintroduced birds are solely there to attract conspecifics which in turn founded the current populations or whether they are actively involved in reproduction as well. In case of the latter it was tested which characteristics of released birds contributed most to the success of this project. Feather samples (> 250 individuals) were used to study genetic relatedness as defined by twenty microsatellite markers. Whereas sibling relatedness gave extra insights on the species' biology, parentage analysis revealed that both types of birds (i.e. rehabilitation and captive bred) contributed equally within the first stages of the project. In concordance with what is known about juvenile dispersal in raptors, reintroduced males produced more offspring in France than their female counterparts. Apart from these crucial insights linked to the reintroduction itself, contrasts between reproductive success of locally hatched -and reintroduced birds pinpoints interesting opportunities for future research. Alongside ongoing efforts in setting up a habitat suitability map, these results might help in deciding upon timing and location of future cinereous Vultures reintroductions.

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Standard talk

Monitoring NSAIDs in carrion and vultures after diclofenac registration for veterinary use in Spain

Marta Herrero, Pablo R. Camarero, Inés S. Sánchez-Barbudo, Roser Velarde, Ignasi Marco, Rafael Mateo

The severe impact of diclofenac in Asian vultures due to its veterinary use has been one of the biggest ecological catastrophes of the last decades, pointing out the deficient environmental risk assessment of some of these compounds. In the case of diclofenac, there was an evident gap in the knowledge of the high toxicity that this non-steroidal anti-inflammatory drug (NSAID) has in Old-World vultures that can feed on treated livestock. Despite this fact, diclofenac was registered for livestock treatment in Spain in 2013, a country that hosts the largest population of European vultures. In this study we have evaluated the risk of exposure to diclofenac and ten other NSAIDs in vultures after its commercialization in Spain. With this purpose we sampled 156 pig, 25 sheep and 2 bovine carrion intended for vulture consumption in feeding stations. In addition, we sampled 183 vulture carcasses of Eurasian Griffon vulture (n = 160), Cinereous vulture (n = 8), Egyptian vulture (n = 7) and Bearded vulture (n = 8). Carrion samples (muscle, liver and kidney) and Vulture samples (liver and kidney) were analysed by liquid chromatography coupled to mass spectrometry (LC-MS--QTOF). Five of the pig carrions analysed (3.27%) had NSAID residues, specifically flunixin (n = 2, 1.31%), diclofenac, ketoprofen and meloxicam (n = 1, 0.65%, each). Six of the Eurasian griffon Vultures analysed (3.75%) showed NSAID residues, specifically flunixin (n = 4, 2.5%) and meloxicam (n = 2, 1.25%). The Vulture with higher levels of flunixin in kidney (22100 µg/kg) and liver (4900 µg/kg) had visceral gout lesions. Residue levels in carrion and scavengers indicate a limited risk of poisoning, however, veterinary use of NSAIDs can still be a threat for scavengers if veterinarians and farmers ignore the associated risk when treated livestock is used to feed Vultures.

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Poster
#9

Mosquito vectors and mosquito transmitted pathogens in Bearded Vulture (*Gypaetus barbatus*) breeding territories

Pilar Gonzalez-Serrano, Isabel Fernandez de Mera, Sarah Delacour, Javier Lucientes, Juan Manuel Blanco, César Clemente, Gerardo Baguena, Juan Antonio Gil, Ursula Höfle

Among the most feared effects of global warming is the geographic expansion of the hematophagous insect vectors and the pathogens they are able to transmit. Species living isolated on islands or at high altitudes, like the bearded vulture, are particularly vulnerable to these processes, as their isolation implies also less contact with pathogens and as a consequence less development of specific defences. Recently, cases of West Nile fever and avian malaria have been observed in bearded vultures kept in captivity, showing their susceptibility to both diseases. However exposure and incidence of these pathogens in free living bearded vultures are still unknown. Between May and August 2018 we captured mosquitoes in seven bearded vulture territories in the Pyrenees and Pre-Pyrenees in the Community of Aragon. Sampling took place during the final part of the nesting period of the bearded vultures, using CDC light traps and Bgsentinel traps baited with CO2 situated below the cliff of nesting site of breeding bearded vultures. Captures revealed the presence of sand flies and Culex gender mosquitoes during this period even in territories located at an altitude of over 2000m, but especially and in higher abundance in territories situated at lower altitudes in the Pre-Pyrenees. In one of these territories we were able to detect carriage of Plasmodium (P.) relictum and P. vaughani in Culex gender mosquitoes and particularly in Culex pipiens species. These results suggest the potential exposure of bearded vulture nestlings to P.relictum, the main causal agent of avian malaria at least in the territories situated in Guara mountains, in the Aragonese Pre-Pyrenees.

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Standard talk

Rehabilitation and release success of an African vulture conservation programme

Alexandra Howard, Ara Monadjem, Neil A Homer-Forbes, Kerri Wolter
The African continent is in the midst of an 'African Vulture Crisis' due to a number of anthropomorphic factors. Threats include intentional and unintentional poisoning, powerline electrocutions, powerline collisions, habitat loss, degradation and fragmentation, as well as a decline of food availability and the illegal trade of vulture body parts for cultural beliefs. Thus rehabilitation of wild birds has become a necessary tool to assist in the survival of wild populations although the effectiveness of rehabilitation is often questioned. VulPro has released a total of 296 rehabilitated vultures back into the wild since its inception in 2007; including the critically endangered African White-backed Vulture (Gyps africanus), endangered Cape Vulture (Gyps coprotheres), and endangered Lappet-faced Vultures (Torgos traceliotus). An analysis of the causes of injury found that the highest successful release rates for vultures admitted are due to adverse weather conditions (80.0%), grounded and dehydrated (64.4%) and poison incidents (58.2%). Injuries due to powerline collisions and electrocutions have the lowest percentages of successfully released vultures. The release rate for 2019 currently stands at 40% from 45 admissions with an increasing trend to improve the 2018 release rate of 65% from 103 admissions. This is to be expected as many of these admissions have been from adverse weather conditions. Previous studies found an annual survival rate of 74.8% for rehabilitated Cape Vultures (Gyps coprotheres) based on modelling from resightings, however it was unable to include the impact of injury type which is what this study aims to address.

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Poster
#10

Causes of non-natural mortality of Egyptian Vultures *Neophron percnopterus* , Griffon Vulture *Gyps fulvus* and Cinereous Vulture *Aegypius monachus* in Portugal

Samuel Infante
The analysis of 182 records of non-natural mortality of the three species over a 20-year period (1999-2019) from CERAS (wildlife rescue center) in Portugal .The most frequent causes of mortality were poisoning (45%) electrocution (20%) and subnutrition (12%). Adults were more electrocuted and poisoned. In breeding areas poison and sub nutrition was the most frequent cause of mortality. Poisoning occurred more frequently in spring and autumn, and appears to be associated with the use of illegal poison in predator control by small game practices and for livestock protection. The decrease in electrocutions and poisoning over the last few years is associated with surveys and corrections on electricity power lines, and the implementation of the ANTIDOTE program to fight against illegal poisoning.

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Speedy talk

The return of Cinereous Vulture in Portugal after 40 years extinct

Samuel Infante, Otilia Urbano, Sergio Saldanha
In 2010 2 chicks were born in Portugal, after 40 long years, thanks to conservation efforts. This is a Critically Endangered species in the country with only 25 pairs in three breeding colonies. In 2010, the first 2 chicks in Portugal were born in the SPA Tejo Internacional Erges Ponsul. This species was extinct as a breeder in Portugal until that year, in which 6 artificial nests were built for this species. This action, associated with supplementary feeding, a plan to monitor and rescue the offspring in the early years, allowed these two couples to become the largest Portuguese colony of Cinereous Vulture with 21 breeding pairs in 2018.

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Standard talk

Assessing vulture mortality at a continental scale: the benefits of centralized and standardized data

David Izquierdo, Louis Phipps, Mirco Lauper, Franziska Lörcher
Assessing and monitoring spatial and temporal patterns of mortality is essential for planning and implementing effective measures to conserve threatened species. For vulture conservation it has been demonstrated that identifying high risk areas for specific threats (e.g. poisoning, collisions, electrocutions) enables the implementation of targeted proactive and reactive measures to effectively reduce mortality rates. The majority of vulture mortality assessments have been performed at a local, regional or national scale, often due to limited availability or sharing of data across administrative borders. In an effort to address this and assess vulture mortality patterns across Europe, the Vulture Conservation Foundation has collated 3192 records of vulture mortality (*Gyps fulvus* = 2765; *Neophron percnopterus* = 176; *Gypaetus barbatus* = 131; *Aegypius monachus* = 119) from 19 range states, contributed by >27 organizations (by March 2019). Although there are strong temporal and spatial biases within the dataset, and a notable lack of contributions from certain areas, the records reveal that poisoning has been the main cause of vulture mortality throughout Europe, followed by collisions. In some cases, mass poisoning incidents have led to the total collapse of national vulture populations in a very short period of time. This presentation will also use data from the International Bearded Vulture Monitoring network to demonstrate the benefits of collecting and collating data in a standardized and centralized way in order to understand and mitigate vulture mortality at multiple scales. We aim to continue to collate and assess vulture mortality records across Europe on a continuous basis in order to inform current and future conservation strategies and appreciate and encourage sustained cross-border collaboration.

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Poster
#11

Captive breeding of Cinereous Vultures at GREFA

Pablo Izquierdo Cezón, Ernesto Álvarez Xusto, Rebeca García Roldán
Since 2000, GREFA has been including unreleasable cinereus vultures (*Aegypius monachus*) to the captive breeding stock, achieving first reproduction in 2009. Since then, several modifications of aviaries and management have enabled the captive breeding program to increase the number of potencial breeding pairs from 1 to 6. Through intensive monitoring, the number of succesful breeding pairs has been increased and the artificial incubation and neonatal cares for the very first dates is allowing us to ensure an increasing number of hatchlings that could be released in the release programs that GREFA is developing.

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Speedy talk

News from the Maestrazgo Bearded Vulture project

Juan Jiménez and Martín Surroca
Thanks to the support of the Spanish Ministry of the Environment, the regional Government of Aragón (GA) and the Vulture Conservation Foundation (VCF), in 2018 a new bearded vulture reintroduction project started in the Maestrazgo (Castellón, E Spain). The species disappeared in the area as nesting in the late XIXth century, but the landscape, the cease of raptor prosecution and the increase of griffon vulture population offers excellent conditions for hosting again the species. From the beginning, the project was designed to use two sources of birds: captive born chicks (VCF) and translocated non-breeding adults (GA). During 2018 2 chicks were introduced through hacking and 2 adults directly released, the four of them equipped with satellite GPS transmitters and all alive at this moment (May 2019). After fledgling, both chicks remained in the release area for a couple of months, then they started to explore the Iberic Mountain range, and dispersed to the north of Spain from March. Regarding the adults, one returned to the Pyrenees just 10 days after the release. Surprisingly, the other adult, despite exploring a huge territory, is still fixed to the release area. The movements of the released birds around the Iberic Mountain ranges have aroused interest in the species in areas where it was long extinct, fostering new reintroduction proposals. Considering the shortage of chicks born in captivity, the release of non-breeding adults from the Pyrenees (estimated in > 250 ex.) becomes an opportunity to supply those projects. To evaluate this possibility it is necessary to improve our knowledge of the non-breeding fraction of the pyrenean population, presumably associated with density dependence mechanisms, and develop techniques for fixing adults to the release site, probably requiring big acclimation cages. New releases of both chicks and adults are scheduled for the next two years.

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Standard talk

Brinzola´s trip: making use of dependence and dispersion periods to improve Cinereous Vulture population management

Ernesto Álvarez, Lorena Juste, Émilie Delepoulle, Iván Peragón, Juan Pablo Díaz
The European population of Cinereous Vulture (*Aegypius monachus*) decreased during the XIX and XX centuries within its historical range, disappearing from part of its historical distribution range and resulting in the isolation of two populations: Western (in Spain) and Eastern (in Balkans and Caucasus) European populations. In Spain, the species disappeared in the northern part of the peninsula, making the connection between both European populations difficult. In order to solve this situation and to connect the extinct populations of the species, GREFA developed the first collaborations with the griffon vulture reintroduction program in Cevenne during the 80s and 90s by providing individuals and tagging some of the released ones. GREFA also participated in the first reintroduction projects started in France by managing cinereous vultures. After the analisis of the movements of many birds tagged in the Central System mountains, the need of a reintroduction program in the Pyrenees (started in 2007) and Iberian System's mountains (started in 2016) was clear in order to connect the Spanish populations with the French colonies. Through a huge investment, GREFA has a database of over 130 individuals' movements thanks to GPS transmitters, allowing us to analize the dispersions and movements of the vultures. In the Pyrenees, after 74 releases, 20 pairs have been established and over 60 individuals have settled down in the colony. In the Iberian System, 31 vultures have been released after two years and the first results are being achieved. The methodology has been modified according to the release area in order to optimize the resources and improve the results. The communication aims to show the methodology developed and the goals achieved by both reintroduction programs.

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Poster
#12

Use of veterinary drugs affecting vultures: Current status in the Balkans

Kapsalis Eleftherios, Kostadinova Irina, Dobrev Vladimir, Arkumarev Volen, Kret Elzbieta, Theodora Skartsi, Dimitrios Vavylis, Haritakis Papaioannou, Ntemiri Konstantina, Panagiotis Kordopatis, Stoyan Nikolov

The widespread use of veterinary medical products (VMPs) and in particular non-steroid anti-inflammatory drugs (NSAIDs) in livestock, is considered as a threat to the health status of vultures. Birds that feed on medicated livestock carcasses are exposed to risks such as kidney failure. We directed interviews to access the use of NSAIDs that are confirmed or potentially dangerous to vultures, as well as the possible safe alternative VMPs. Data collected on the former concerned mainly Diclofenac, Carpofen, Flunixin, Ketoprofen, Aceclofenac, Phenylbuntazole, Metamizole and Nimesulide, while on the latter it focused mainly on Meloxicam.The research focused on the Egyptian Vulture's breeding grounds, in three areas in Greece (Epirus, Central Greece and Thrace) and three areas in Bulgaria (Eastern Rhodopes, Norht-eastern Bulgaria and Eastern Stara Planina). 22 veterinarians and 41 livestock keepers were interviewed in 10 SPAs in Greece while 22 veterinarians, 44 livestock keepers, 5 managers of farms/cooperatives and 3 farm workers were interviewed in 10 SPAs in Bulgaria. VMPs were classified in three categories: anti-inflammatory, antibiotics and antiparasitics. According to our study's results, the first are rarely used, the second are used to treat animals occasionally while the latter for prevention once or twice per year. Self-treatment practices by livestock keepers were registered in all the target areas. The most frequently used NSAIDs were Metamizole and Ketoprofen in Bulgaria and Flunixin and Meloxicam in Greece. Diclofenac was reported to be used rarely by livestock keepers (as a self-treatment practice without veterinary control) in 20 settlements in the survey area in Bulgaria and not at all in Greece. Meloxicam was reported to being used in both countries as well as Flunixin and Ketoprofen. Metamizol was recorded in Bulgaria only and Carprofen only in Greece. Discrepancy between the legislation rules and their implementation in practice was observed.

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Standard talk

Griffon Vultures of Cyprus – legacy of conservation past and looking to the future

Nikos Kassinis, Melpo Apostolidou, Christina Ieronymidou
The island of Cyprus is host to the smallest breeding population of Griffon Vulture, *Gyps fulvus*, in Europe. With around 20 free-flying birds and just 1 – 3 nesting pairs per year, the Cyprus Griffon is currently on the brink of extinction. Although the species historically was common and widespread in Cyprus until the late 1950s and early 1960s, the Griffon Vulture population declined rapidly to just 8 – 10 pairs by the turn of the century, and by 2012 the population size was estimated to have reached just 10 – 11 individuals. A major recent effort to prevent the species extinction from Cyprus was carried out through EU and government funding. This effort, code-named Project GYPAS, focused on the reinforcement of the local population of Griffon Vultures with imported individuals from Crete, Greece, and the establishment and expansion of feeding stations. However, nesting activity is low and poisoning incidents have undermined these efforts and as a result the population continued to decline. We present an overview of the historical and current Griffon Vulture population trends and their drivers in Cyprus and we review past conservation efforts aimed at this iconic species. Furthermore, we highlight the ongoing threats to the species, in particular the widespread use of poison bait, which results in mortality through secondary poisoning. Finally, we outline the path to future conservation work at this critical juncture for the Griffons of Cyprus.

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Standard talk

Population range and connectivity of three species of *Gyps* vultures in Africa: A continent-wide perspective

Corinne Kendall

The African vulture crisis has generated considerable interest in African vulture ecology and movement, leading to a multitude of studies throughout the continent. In order to address declines, telemetry has become a critical tool for identifying mortality rates and causes, understanding foraging ecology, and assessing risk of various threats, particularly poison exposure, powerline deaths, and collision with wind farms. Multi-site studies can provide insight on a larger geographic scale to establish plasticity of ranging behaviors and assess population connectivity between regions. A team of researchers are collaborating to bring together telemetry data from 11 sites and over 150 individuals of three *Gyps* species found in the African continent. In our first step to understand vulture behavior at a continent-wide scale, we evaluate variation in home range size between sites and species and assess population connectivity between sites. This work will allow us to establish conservation priorities across the continent by determining the range of critical populations and location of corridors of *Gyps* vultures. In addition, a greater understanding of regional variation in behavior will underscore how differences in threats and ecology may impact extinction risk of these critically endangered species throughout the continent.

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poster
#13

Ex-site vulture care at the Wildlife Rescue Centre of Green Balkans

Ivaylo Klisurov, Elena Kmetova-Biro
The talk will present the actions of the Wildlife Rescue Centre of Green Balkans, Bulgaria, aiming at ex-situ conservation of the four species of European vultures – Griffon (*Gyps fulvus*), Cinereous (*Aegypius monachus*), Bearded (*Gypaetus barbatus*) and Egyptian (*Neophron percnopterus*) Vulture. The Rescue Centre typically admits between 10 to 20 vultures per year for treatment, rehabilitation or post-mortem analysis. Our team will present our practical experience in treatment, rehabilitation, innovative surgery interventions, diagnostics and quarantine of the vultures we are admitting. We will discuss the main reasons for admission, sharing our findings on the main threats for the wild and re-established vulture populations on the Balkans. The Wildlife Rescue Centre currently maintains egg-laying pairs of all the four vulture species, having successfully bred Griffon and Bearded Vulture until fledging. Our team will present the up-to-date challenges and success in our vulture captive breeding programmes, producing offspring for several vulture restoration projects across Europe. We will discuss and present networking opportunities with other breeding and rehabilitation centres and zoos in Europe. The team will present joint actions held with various institutions and partners on particular cases of interest, where the team of Green Balkans involves numerous experts and staff of the Veterinary Medicine Faculty of the Thracian University of Stara Zagora, Bulgaria – surgeons, microbiologists, experts on patoanathomy, infectious diseases and toxicology.

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Standard talk

Current results of the restoration efforts of large vultures in Bulgaria

Ivelin Ivanov, Emilian Stoynov, Georgi Stoyanov, Hristo Peshev, Iliyan Stoev, Elena Stoeva, Nadya Vangelova, Elena Kmetova-Biro

The talk will present the large vulture conservation efforts of three leading Bulgarian nature conservation NGOs, namely – Green Balkans NGO, the Fund for Wild Flora and Fauna and the Birds of Prey Protection Society. These organizations all run long-term conservation programmes in attempt to restore Griffon, Black and Bearded Vulture, considered extinct in the Balkan Mountains of Bulgaria and Kresna Gorge and to strengthen and support the existing or newly established populations through limiting threats, improving the foraging and nesting conditions and raising awareness. The talk will present the results of the on-going vulture restoration efforts at October 2019, following the historic initial release of already ten (at April 2019) Cinereous Vultures (*Aegypius monachus*) in the Eastern Balkan Mountains of Bulgaria, started in July 2018. The talk will outline the release methodology and expected results as preliminary set up and planned and follow the actual implementation and practical experience gained on field. All Cinereous Vultures released have been tagged with transmitters so their dispersal and behavior is strictly followed and can be individually presented and compared. The monitoring team will therefore share initial thoughts and considerations related to the release and adaptation of these birds and outline the following steps towards a successful restoration of the species in the area. The team will also present summarized results of the on-going Griffon Vulture restoration programme in the Balkan Mountains of Bulgaria and Kresna Gorge. The efforts started in 2008 have lead to the successful re-establishment of the species at an estimated number of 27-40 breeding pairs in seven newly formed small colonies in four of the five release sites at April 2019.

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Poster
#14

Development of a Multi-species Action Plan for Vultures in Greece: a first step towards an integrated approach for vulture conservation

Panagiotis Kordopatis, Victoria Saravia, Konstantina Ntemiri, Ioannis Mitsopoulos, Stavros Xirouchakis

A multi-species action plan (MsAP) for three vulture species in Greece, i.e. *Gypaetus barbatus*, *Aegypius monachus* and *Gyps fulvus*, is under preparation in the framework of the first Greek Integrated LIFE project "LIFE IP 4 Natura" (LIFE16 IPE/GR/000002), which addresses the planning and implementation of specific priority measures set by the Greek PAF (2014-2020) for the NATURA 2000 sites network and pursuant to Article 8 of the EU "Habitats Directive" and the EU Biodiversity strategy. This MsAP aims to halt the current population declines of the targeted species, reverse their negative population trends and increase their range. Its ultimate goal is the upgrading of the vultures' conservation status to a favourable level at a national scale. A draft is already underway -drawn up by the Hellenic Ornithological Society (HOS/ BirdLife Greece)-, providing the most recent update on the status of these three species in Greece as well as the major threats they face, namely: poisoning, food availability, habitat loss or degradation and direct mortality or expulsion caused by energy generation and transmission facilities. The development of this draft included a series of conferences, workshops and consultations meetings with stakeholders and experts, as well as an overview of the international agreements and policies assessing possible synergies that can support the achievement of the MsAP objectives. The Vulture MsAP will be submitted to the Greek Ministry of Environment and Energy in November 2019 while its legal adoption is foreseen to take place by mid-2020. Its implementation will start immediately after, led by HOS and will be completed in 2025 in the frame of the LIFE IP 4 Natura. Its actions will include research, monitoring, policy and legislation, awareness raising, capacity building activities for protected areas administrators and of course, concrete conservation actions application.

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Poster
#15

Could lead poisoning in vultures be a reason of population reduction in Albania?

Pellumb Aleksi and Klea Korro
Albania, a state of West Balkan, is widely known for its rich flora and fauna. After 1990 Albania left communism era, but unfortunately its flora and fauna remained damaged because of the lack of protective laws and institutions. Even though in 2014 the government applied a Moratorium for illegal hunting, wild carnivores are still being killed by cattlemen in order to protect their cattle's. During 2014-2018, over 17 cases of vulture poisonings were presented in Wildlife Animals Lab in Agriculture University of Tirana. These cases were mainly reported by students, environmental associations or employees of forest directories. From the information gathered by our samples in this lab, we observed 11 lead poisoning cases in vultures, 3 are suspected cases from diclofenac based on sign visceral gout and the presence of a high percentage of uric acid in concentration serum and 3 other cases as a result of other causatives. Taking this study into consideration, we proposed the hypothesis that lead poisoning in vultures could be the main reason of the reduction in the number of this population in Albania. Even though our study is based on casual analyzed samples, it still gives information regarding the reduction of the population.

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Standard talk

Sniffing dogs at the service of vultures - results from the operation of the first anti-poison dog units in the Balkans

Elzbieta Kret, Victoria Saravia, Dimitris Vavylis
The illegal use of poison baits is a widespread practice in the Greek countryside, constituting the leading cause of non-natural mortality for many endangered scavenger species. Vultures, as obligate scavengers, are highly vulnerable to primary and secondary poisoning. Only between 2012 and 2015, six Egyptian vultures (*Neophron percnopterus*) were recorded poisoned in the country. To address this threat, two teams consisting of dogs specially trained for the detection of poisoned baits were created in 2014 in Central Greece and Thrace respectively. Since March 2014 until May 2019, a total of 345 patrols were conducted, covering 756 kilometers and detecting 187 dead animals identified as poisoned. Eight Black vultures (*Aegypius monachus*) and six Griffon vultures (*Gyps fulvus*) were found (4,3% and 3,2% of all findings respectively), although the most commonly poisoned species was the dog (Canis lupus familiaris) with 102 fatalities (54,5%) followed by the fox (Vulpes vulpes) with 38 fatalities (20,3%). In some cases a combination of satellite transmitters mounted on vultures together with the help of the dogs increased the efficiency of poison incident detecting, contributing to mitigate the potential range/impact of the given incidents. A total of 198 poison baits was discovered, varying from pieces of meat with poison, pieces of fat containing a paraffin capsule with cyanide to a whole animal carcass laced with poison. In February 2019 a Golden eagle (Aquila chrysaetos) was found poisoned by cyanide - the first raptor ever recorded in Greece to die from this type of poison. Moreover, toxicological analyses have revealed also the use of banned pesticides such as Endosulfan, Carbofuran and Phorate. The Anti-poison Dog Units are an innovative and effective tool in tackling the problem of wildlife poisoning while preventing further poisonings. Many scavengers, including vultures, were potentially saved from a certain death.

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Speedy talk

Conservation issues of critically endangered gyps vultures in Assam, India

Kulojyoti Lahkar
Three species of vultures (*Gyps bengalensis, G. tenuirostris and G. indicus*) have been declined catastrophically in the south Asia in the last two decades as a result of expose to the diclofenac and possibly to other non-steroidal anti-inflammatory drugs with similar properties through the carcasses of treated livestock. To know the status and to initiate a long term conservation process for two critically endangered vultures (*G. tenuirostris and G. bengalensis*) in Assam, India; we initiated a survey in 2002 and thereafter surveying and monitoring regularly to know about the factors which are currently affecting their survival. These factors include the deliberate poisoning of carcasses with insecticides and pesticides to kill carnivores, rabid dog and rabid jackal; being killed accidentally by vehicles and trains while feeding on carcasses on roads and railway tracks; hunting chicks and adult birds for meat, egg collection for medicinal purposes, destruction of nests; and cutting and thinning of nesting trees. In order to ensure the long-term conservation of critically endangered gyps vultures in wild in Assam, we propose: education programmes among local communities to protect nests, nestlings and nesting trees; to use safer drugs in veterinary medicine instead of diclofenac and other NSAIDs with similar properties, and to stop the poisoning of carcasses likely to be consumed by vultures.

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Standard talk

Spatial and temporal variability and flexibility in migration of a globally endangered avian scavenger across three continents

W. Louis Phipps, Pascual López-López, Evan R. Buechley, Steffen Oppel
Disentangling individual and population level variation in migratory movements is necessary for predicting how different species will respond to environmental changes and for assessing their exposure to threats across their ranges. However, very few studies have analyzed these patterns across large portions of species distributions. We compiled a large telemetry dataset on the globally endangered Egyptian Vulture *Neophron percnopterus* (64 individuals, 191 completed migratory journeys), tracked across ~70% of the species' global range, to analyze spatial and temporal variability of migratory movements within and among individuals and populations. We found high migratory connectivity at large spatial scales, but very diffuse migratory connectivity within subpopulations, with wintering ranges up to 4000 km apart for birds breeding in the same region. Additionally, Egyptian Vultures exhibited a high level of variability at the subpopulation level and flexibility at the individual level in basic migration parameters. Subpopulations differed significantly in travel distance and straightness of migratory movements, while differences in migration speed and duration differed as much between seasons and among individuals within subpopulations as between subpopulations. On average, the total distances of the migrations completed by individuals from the Balkans (7338 ± 1729 km) and Caucasus (6042 ± 1566 km) were up to twice as long and less direct than those in Western Europe (3732 ± 767 km), and consequently were longer in duration, despite faster migration speeds. These differences appear to be largely attributable to geographic barriers on migration. In contrast to most migratory birds, adult spring migrations were longer and slower than fall migrations, which may be a consequence of less favorable tailwind conditions in spring. The differential exposure of Egyptian Vulture subpopulations to anthropogenic threats presents significant challenges for conserving this endangered species across a broad geographical range intersecting >40 different countries on three continents.

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Key-note

Bearded Vulture reintroduction in Europe

Franziska Lörcher

The Bearded Vulture reintroduction across Europe represent one of the most successful wildlife comeback stories in the world. The Bearded Vulture was extirpated from most of its former distribution range within Europe and only in the Pyrenees, on Corsica, and on Crete small autochthonous populations remained. Major efforts have been made to breed the species in captivity in order to reintroduce it back to the wild without endangering any autochthonous population. So far, this EEP supplements five different reintroduction or restocking projects, whereby the allocation of the birds for the releases is coordinated by the EEP and the Vulture Conservation Foundation based on an international conservation and reintroduction strategy aiming for the restoration of a European meta-population. Since the first release in 1986 in the Kruml Valley in Austria more than 50 breeding pairs settled all over the Alps. In Andalusia, Spain, the first birds were released in 2006 and five breeding pairs are established today, a small but growing population. Since 2016 birds from the captive breeding stock have also been released in Corsica to increase the genetic diversity of the remaining population as well as to increase the number of birds. The connection of the Alpine and the Pyrenean populations with releases in the Massif Central and the French Pre-Alps and linking Andalusia and the Pyrenees with releases in the Maestrazgo region in southern Spain are important ongoing initiatives for building up the European meta-population. All released birds are subject to an intensive and internationally coordinated monitoring programme. In the Alps the survival rate of juvenile birds is estimated at 0.88 and for older birds at 0.96. In combination with an average productivity of 0.63 in the last 10 years, the population is growing and demographically self-sustainable. But not only biological factors contributed to the success of the project. Other important key factors of the successful reintroduction projects are the strong partnership between all the regional and national stakeholders involved, the international coordination of captive-breeding and monitoring by the VCF and all partners involved with the International Bearded Vulture Monitoring (IBM) network. Despite the successes, some major challenges remain, with threats such as poisoning, electrocution and collision persisting, and low genetic diversity making these populations particularly sensitive to elevated mortality or environmental perturbation.

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Standard talk

Feathers tell a story: Genetic monitoring of Bearded Vultures in the Alps

Franziska Lörcher
The Bearded Vulture population in the Alps has been intensively monitored since the start of the reintroduction project in 1986. Since 1998 not only visual observations but also genetic methods have been used to follow the individuals and population. Each captive bred bird is genotyped with 24 microsatellites using a blood sample. The wild birds are genetically monitored using almost exclusively non-invasive feather samples found by chance or targeted searches in nest areas. Of the more than 2300 feathers collected, 1000 were analysed, resulting in the identification of 213 different individuals. 117 out of 233 wild-hatched birds could be genotyped. This intensive genetic monitoring enabled us to reconstruct most of the pedigree, spanning now five generations. The pedigree analysis showed a very skewed founder contribution in the wild-breeding population with more than half of the genetic information originating from only 6 founder birds. The genetic diversity of the current wild population is estimated to be 13.5 founder genome equivalents (fge). With no influx of new genetic material (via natural migration or selected releases) the amount of inbreeding will increase in the near future and inbreeding depression might put the population in danger. Therefore, it was necessary to adjust the release strategy and carefully select which birds are released in which area. Further, projects such as the LIFE GypConnect aim at connection the Pyrenean and Alpine Bearded Vulture population. But only the genetic monitoring will be able to detect such migrants and show the success of the connection. Beside the estimation of the genetic diversity and detection of migrants, the genetic monitoring gives us insight into family histories, breeding pair constitutions and native dispersal distances.

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Speedy talk

Evaluation of changes in the size of the migratory part of the population of juvenile Eurasian Griffon Vulture *Gyps fulvus* in continental climate using the colour-marking technique

Saša Marinković and Irena Hribšek
This study has been part of protection measures programs for renewing species of vultures in Serbia and adjacent regions. Today Serbia has the biggest population of Eurasian Griffon *Gyps fulvus* in the continental part of Balkan Peninsula with 262 territorial pairs. The colonies in Serbia have a central position on the Balkan Peninsula and they are an important spot on the flyaway between colonies on the Balkan. The first neighbouring breeding colonies of Eurasian Griffon Vulture are at the 300 km distance. This study includes 261 juvenile Eurasian Griffons tagged on nests in Uvac colony in western Serbia with patagial wing-tags and both metal and colour PVC rings, in a period between 2004 and 2018. We have collected 2086 data of marked birds. Sightings were reported from 20 different countries, a total of 946 outside of Serbia, and 1.880 as loco findings (sightings inside area of 100 km). There were 420 sightings of birds with foreign wing-tags of immigrant birds from 8 different countries. We presume that most of those birds could be native to our colonies since none of those birds were marked in the nest, but captured in other countries by a trap during the migration and marked. The majority of marked immigrant birds were originated from eastern subpopulation, while only two Western Europe subpopulation immigrants have been recorded. Before the introduction of the feeding station program in 1994, all the young birds in winter migrated into the Mediterranean climate region. The size of the migratory part of the juvenile population is negatively correlated with the amount of food available and intraspecific competition. The presented demographic data and migratory flyway routes may help with the planning and development of favourable rcorridors and strategy for the successful renewing and conservation of vulture populations on the Balkan Peninsula.

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Poster
#31

Illegal use of poison in Portugal: the possible portrait

Liliana Barosa, Paulo Marques, Bruno Martins
Poisoning is one of the greatest threats to numerous wild species, many with high conservation status (e.g. Iberian imperial eagle and vultures). The illegal use of poison is often associated with predators' control within game and livestock breeding activities, but personal conflicts are also a motivation. The ease with which poisons can be acquired and applied, combined with the number of individuals it can affect and its non-selectivity, makes it unpredictable and uncontrollable. Poisoning might even reach humans and domestic animals and, thus, constitutes a serious public health problem. Yet, the information about poisoning incidence in Portugal was scattered. This study, conducted within LIFE Imperial Project (LIFE13NAT/PT/001300), aimed to assess the use of poison in Portugal and determine its temporal, seasonal and geographic patterns, to contribute in the action against poison. We collected data of possible poisoning cases in Portugal from 3 different data sources: PAP – Portuguese Antidote Project (2003-2014), 3 wildlife recovery centres (CERVAS, RIAS and CERAS; 2010-2015) and GNR – National Police Authority (2013-2015). Over 500 cases of possible poisoning affecting domestic and wild species were collected. Baits were very diverse and included meat, dog food or fish, and involved illegal toxics, such as strychnine and aldicarb. The study identified 43 wild species possibly affected by poisoning, including 4 Critically endangered (like cinereous vulture). Within the protected species, griffon vulture, red kite and Iberian wolf presented the higher number of individuals affected by possible poisoning. The results suggest that the use of poison is wide spread across Portugal. Seasonally, we found a concentration of cases in October and from January to March. Unfortunately, due to the lack of quality data, we were not able to assess its annual trend. Continuous monitoring the illegal use of poison is fundamental to coordinate the action against this illegal practice.

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Speedy talk

A comparative study of bird flight height: man vs photogrammetry

Francis R. Martens, Morgan B. Pfeiffer, Colleen T. Downs, Jan A. Venter
Flight height of large soaring birds is influenced by topographic and climatic conditions, putting them at risk with wind energy development (WED). Various techniques to identify collision probability are available in South Africa. Monitoring of flight height through ground observations is considered a suitable method in environmental impact assessments prior to WED. The accuracy of such methods however remains unknown. This study aimed to compare accuracy of ground observations with photogrammetry observations. Photogrammetry is a well-established science that makes use of photographs to measure features. The study was conducted at a vulture restaurant adjacent to the De Hoop Nature Reserve, Western Cape Province, South Africa. The reserve holds a southern African endemic bird species, the Cape Vulture (Gyps coprotheres), currently listed on the IUCN Red List as “Endangered”. With the establishment of a WED close to the colony, the Cape Vulture is a priority species for determining flight height. Photogrammetry flight height was recorded with three DLSR cameras. Photographs were uploaded to PhotoModeler to determine flight height. Ground observations were conducted by inexperienced and experienced observers. Accuracy of flight height between observers and photogrammetry was tested. Accuracy of flight height between inexperienced and experienced observers was tested. Accurate flight height may help to mitigate collision probability of large soaring birds with WED’s.

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Speedy talk

The value of international cooperation for monitoring raptor populations in the Western Mediterranean: lessons learned from Atlas Programme in Morocco

Justo Martín Martín, José Rafael Garrido López, Violeta Barrios, Catherine Numa, Helena Clavero Sousa

Long-term monitoring programs of threatened fauna provide basic information to carry out management actions aimed at their conservation at different scales, actions that will have a positive impact on the whole biodiversity. In 2019, an initiative to carry out an inventory of raptors and the threats to them was launched in Morocco – a key country for raptors in the Mediterranean region- as a joint initiative of the High Commissioner for Water and Forests of the Kingdom of Morocco, the IUCN Centre for Mediterranean Cooperation (IUCN-Med), with the collaboration of national and international conservation organizations and the technical support of the Regional government of Andalusia (Spain). The first objectives of the Atlas Program are to conduct an initial inventory of diurnal cliff-nesting raptors in Morocco, to monitor their demographic and geographical evolution, as well as to identify threats that may negatively affect them. The design of the monitoring program and the first results obtained during 2019 and their implications for conservation of raptors at a larger regional scale are discussed.

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Standard talk

Rewilding processes shape the use of Mediterranean landscapes by a top avian scavenger

Paula Martin-Díaz, Ainara Cortés-Avizanda, David Serrano, Eneko Arrondo, José Antonio Sánchez-Zapata and José Antonio Donázar

Rewilding processes can modify the availability of domestic and wild carrion resources for large avian scavengers and reduce accesible open areas due to increase of shrub and forest. We examined how changes in past five decades (1956-2011) in landscape configuration would mediate foraging behaviour of griffon vultures. In particular, we examine whether vultures use those areas under natural succession and high availability of wild ungulates. This research was carried out in a very representative area of Mediterranean landscapes under rewilding process. The study area ranges from western Sierra Morena to eastern Sierra de Cazorla, both of which are mountain ranges that embrace the Guadalquivir Valley, Andalusia, South Spain. We used GPS information yielded by 30 adult griffon vultures exploiting large regions of southern Spain. First we determined habitat selection on the basis of compositional analyses and the particular influence of environmental variables and abundance of trophic resources. We then determined how tracked individuals used Mediterranean habitat patches in relation to the degree of rewilding over the last few decades. Results showed that the vultures preferentially used Mediterranean scrublands, woodlands and dehesas, as well as areas where the availability of trophic resources is higher: wild ungulates in winter and livestock carcasses in summer. Moreover, and likely due to a higher availability of wild ungulates, vultures forage preferentially in areas that are recently abandoned and showing intermediate stages of rewilding. Since rewilding processes are expected to continue in the future, Mediterranean habitats and wild ungulates will be increasingly important to populations of top scavengers. Predictably, these changes will deeply affect the scavenger guild and the structure of trophic networks in Mediterranean ecosystems. Managing these changes will be essential to conserve ecological processes of interest, ecosystem services and populations of endangered species.

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Poster
#16

European Black Vulture: a global approach for conservation actions

Thierry Bouchet, Yannis You, Christophe Gaborit, Fanny Martin-Blais
For many years, The Grand Parc of Puy du Fou participates and collaborates in many conservation actions in favor of the European Black Vulture. From the reproduction of the species to its reintroduction, through awareness and training sessions, its approach is global. As an ex-situ institution, sharing with in situ conservationists is very important. That's why, a conservation education trip was organized, in order to understand the importance of complementarity of each one.

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Key-Note

The challenge of managing human-mediated carcasses for vulture conservation

Patricia Mateo-Tomás
After the outbreak of the Bovine Spongiform Encephalopathy (i.e., BSE or “mad cow disease”) in 1986–1996, the European Union (EU) implemented sanitary legislations that prohibited the abandonment of livestock carcasses in the field. These regulations were progressively amended (up to 7 times in 10 years) to better integrate scavenger conservation. By recognizing the need of taking “into account the natural consumption patterns” of scavengers, EU Regulation 1069/2009 was a turning point. Its implementation, guided by EU Regulation 142/2011, authorised the designation of Scavenger Feeding Zones (SFZs) where fallen livestock could be left in situ for feeding scavengers, including vultures. Nonetheless, despite major achievements regarding the integration of scavenger conservation into EU sanitary policies, some shortfalls, such as an uneven implementation of sanitary regulations across and within Member States, and deficient compliance and monitoring, can jeopardize the main objectives of these regulations to conceal biodiversity conservation and public health. While the unequally designation of SFZs can be offset through, for example, clear and homogeneous implementation criteria (e.g. avoiding large variations of up to 72% in the area designated as SFZs), the high uncertainty in the estimates used to monitor such implementation (i.e. that could vary up to >150% depending on the criteria used for calculation) could be overcome by systematic on-ground carcass monitoring. This may also provide useful information to fill important knowledge gaps (e.g. food shortages compromising scavenger conservation, potential risks of disease transmission). The prominent role of Europe as a conservation stronghold for vultures and other threatened scavengers (e.g. large carnivores) faces key challenges concerning the management of human-mediated carcasses. Major issues identified up to date include carcass availability and quality but also the approaches employed to support the conservation of scavengers, that range from law enforcement to stakeholders’ involvement or the ecosystem services argument.

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Standard talk

Movements and population structure of a unique wintering population of the globally endangered Egyptian Vulture in south-western Europe

Jon Morant Etxebarria, José María Abad-Gómez, Toribio Álvarez, Ángel Sánchez, Pascual López-López, Iñigo Zuberogoitia Arroyo

Partial migration is the commonest and more widespread migration strategy in animals. Switching between both strategies (from migrant to resident) occur at the population and individual level. Although some studies have investigated the causes and consequences of these changes, very few have assessed population structure and differences in movement parameters accounting for season, age and gender in overlapping breeding and non-breeding (wintering) areas. In this communication, we will describe for the first time the movement ecology of the biggest wintering population of Egyptian Vultures in south-western Europe. A combination of field surveys and GPS tracking monitoring from November to February during four wintering seasons (2014-2018) revealed that wintering population consisted on average on 78.68 (sd = 31.21, range = 29-132) individuals. Age classes were divided into 75.98% adults and 24.01% subadults. Individuals were counted in five different roosting sites located near to farms, illegal supplementary feeding points, and a vulture restaurant. Our results showed that home range areas, step length, net square displacement, and total distance vary all over the wintering season, increasing in the lastest part of the wintering seasons. Interestingly, we observed differences between adult and subadult birds in movement parameters such as cumulative distance, mean squared displacement, straightness, and intensity of use. Our results suggest that overall birds tend to rest near to roosting sites where predictable food resources exist. Finally, differences in movement parameters observed between age classes indicate that adults birds use differences resources with different degree of intensity and tend to move less as the breeding season approaches, showing higher territoriality than subadult birds. Overall, we suggest to conserve wintering roosting sites and include them under some figure of legal protection due to their vulnerability and uniqueness at European level.

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Standard talk

Feeding within the crowd: behavioural and conservation implications for European vultures

Rubén Moreno-Opo and Antoni Margalida
Competition for limiting natural resources generates complex networks of relationships within obligate scavengers, both at the intra- and interspecific levels, establishing coexistence and hierarchical scenarios, following specialized coevolutionary adaptations. In this regard, supplementary feeding is a common management technique used to alleviate threats to scavengers related to the quality and availability of food resources which should be optimized from an ecological and conservation perspective. This presentation summarizes the food preferences in the four European vulture species and updates their behavioral and hierarchical organization during carrion exploitation. We installed high-resolution video cameras at six Spanish feeding stations recording more than 7 500 hours of observations at 105 feeding events. Regarding food preferences we found that carrion features influence differential selection between species and age-classes, and consequently, their abundance level at carrion inputs. Large inputs of unscattered carrion increased the abundance of griffon vultures while the numbers of bearded, Egyptian and cinereous vultures were favoured when less biomass was supplied and when the food provided was not presented as whole carcasses. In relation to behavioural organization, we recognized the diversity and complementarity of strategies aimed at exploiting the same resource by different species and age classes. Active feeding time, the way that scavengers ate the food, the number of feeding pecks, and occupation of specialized trophic niches varied among species and led to a decrease in competition for resource exploitation. Regarding hierarchies, we found a despotic dominance gradient from the larger species to smaller ones, and from the adults to subadults and juveniles, following an age and body size-based linear pattern. These findings can be used to optimize the supplementary provisioning of vultures in cases it is considered essential, as well as reveal the important role of this food source from ecological, evolutionary, behavioral and conservation standpoints.

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Poster
#17

Recent colonization of Mallorca by Griffon Vulture

Jordi Muntaner
Recent colonization of Mallorca by the griffon vulture. The griffon vulture was an exceptional species in the Balearic Islands, with some records of solitary specimens in Mallorca. On October 31, 2008 an unprecedented event occurred, a strong storm of component SW-NE, with winds of force 7/8 (Beaufort scale), interrupted a group of 500 to 800 specimens that moved to the SW by the coast of Murcia (SE of Spain), very close to Cabo de Palos. This group was heading towards the south of Spain, as it is described in the bibliography. These strong winds displaced a large number of individuals towards the Balearics. From October 31 to November 12, 68 griffon vultures were seen in Menorca, where they had never been cited. As of October 31, numerous observations were made in Ibiza and Mallorca. A group stayed in Mallorca, where it was possible to photograph and observe the specimen with 8NN wing marks seen previously in Murcia, which allows us to affirm that the specimens arrived in the Balearic Islands came from that area. Mallorca, with 3,640 km2, an important mountain range, with abundant sheep and goats, was optimal for the settlement of these vultures. On November 13 and 14, 2010, they counted a minimum of 53 vultures on the island. The 2012 began to reproduce and since that year the reproduction is monitored, the data of which is presented below. It remains to be seen if this population maintains contact with the Spanish continental population.

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Poster
#18

Interactions between Pied Crows and breeding White-backed Vultures

Campbell Murn and Thomas F. Johnson
African White-backed Vultures Gyps africanus are Critically Endangered, mainly due to mortality from poisoning, but the species also exhibits variable breeding productivity that may partially be explained by nest failure due to predation. Pied Crows Corvus albus have been implicated as nest predators, but because there is no evidence linking Pied Crows to low breeding productivity of White-backed Vultures, we used a combination of dummy eggs (n = 14) and camera traps on active nests (n = 10), to investigate what species visit White-backed Vulture nests (both active and abandoned) and predate on their eggs. We recorded 47 egg predation events, of which 37 (79%) were attributable to Pied Crows, while other predators (unidentified large raptors, White-backed Vultures and Vervet Monkeys) were recorded interacting with eggs five times in total. Mobbing by Pied Crows of incubating vultures increased the probability vultures would abandon their nest but crows did not eat abandoned eggs as soon as they were available. Further studies are needed across a wider range of vulture breeding areas to contextualise these findings in terms of both breeding productivity and the significant risks of mortality faced by vultures from poisoning and other threats.

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Standard talk

Using known occupancy areas to understand what affects detection probability of big raptors like vultures

Campbell Murn
Some species are difficult to detect and imperfect detection can lead to inaccurate estimates of occupancy. We used sightings data of White-headed Vultures in areas of known occupancy (breeding territories) to calculate the detection probability of a large raptor and the factors affecting it. Because occupancy was known we were able to focus on identifying sources of variation in detection probability. Using data from 359 vulture territory visits we assessed nine covariates in 29 candidate models. The highest-supported model indicated that observer speed during a survey, time of year and length of time in a territory influenced detection probability. Average detection probability from this model was 0.207 (SE: 0.033) and the mean number of visits to determine the absence of White-headed Vultures in a potential breeding area is 13 (95 % CI: 9 – 20). Topographical and habitat covariates contributed little to the best models and had little effect on detection probability. The low detection probability of some species means that emphasising habitat covariates could lead to spurious results in occupancy models that fail to incorporate temporal components. Variation in detection probability is complex and influenced by effects at both temporal and spatial scales, but temporal covariates can and should be controlled as part of robust survey designs. Accounting for detection probability in occupancy studies is essential, particularly during presence/absence studies for species that occur at low densities, such as raptors

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Standard talk

Restoration of Bearded Vulture's corridor between alps Alps and Pyrenees: the program LIFE GYPCONNECT. Results and prospects

Raphael Néouze, Léa Giraud, Pascal Orabi
The LIFE GYPCONNECT Program has to this end designed action plans to strengthen Bearded Vulture (*Gypaetus barbatus*) populations and to promote exchanges between the core populations of the Alps and Pyrenees. The program is based on current reintroduction operations in the Pre-Alps (Drôme) and Massif Central (Lozčre, Aveyron, Gard, Hérault) and to improve access to food resources in the Eastern regions of the Pyrenees (Aude). The reintroduction programs in the Drôme and Massif Central regions (Lozčre, Aveyron, Gard) aim at promoting exchanges between the birds in the Alps and Pyrenees and thus to more globally contribute to genuine sustainability between the Central and Southern Europe populations. The LIFE GYPCONNECT program is therefore an undeniable asset in revitalizing the return of the Bearded Vulture to its endemic area of distribution. Both from the standpoint of population dynamics, genetic diversity and as regards sustainability probabilities, the project is of considerable importance to the return of the Bearded Vulture to Europe. After 4 years of implementation, we will present you the current results regarding reintroduction, improving food resources, limiting threats, awareness raising and discuss about the long-term post program.

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Poster
#19

How did we get to the endorsement of Local Action Plans against poisoning in Greece? A small victory to a continuous battle

Konstantina Ntemiri, Victoria Saravia, Dimitris Vavylis, Dora Theodora Skartsi, Elzbieta Kret, Popi Kalliopi Baxevani, Panos Panagiotis Kordopatis

Poisoning constitutes the most significant threat for vulture species in Greece. Since 2000, more than 200 vultures have been recorded poisoned, a number representing only the tip of the iceberg. Due to the lack of action from the Greek State, the EC started an infringement procedure in 2013 in regards to wildlife poisoning. At the same period and on the occasion of the collapse of the largest colony of Griffon vultures in Nestos Straits in mainland Greece, 7 NGOs and bodies formed the Antipoison Task Force (APTF) and also ensured the intervention of the Greek Ombudsman. The main aim of the APTF, coordinated by the Hellenic Ornithological Society is to push the issue of poisoning further up in the agenda of the authorities and promote the necessary legislative framework for tackling this threat. APTF actions include the development of a recording protocol and data collection scheme and an Antipoison Database, depicting the hot-spots of vultures poisoning incidents. Under the mounting pressure resulted from the abovementioned interventions, as well as intense conservation actions at the local level and a series of meetings and seminars with the competent authorities led by NGOs that highlighted the significance of the problem, the administration initiated actions against poisoning. Specifically, in close collaboration with the APTF, under the framework of the Egyptian Vulture new LIFE project LIFE16NAT/BG/000874 (successor of the previous “The Return of the Neophron” LIFE10 NAT/BG/000152), the Ministry of Environment endorsed the Local Actions Plans against the Illegal Use of Poison Baits (LAPs). The LAPs will act as a road map for the competent authorities on how to properly manage poisoning incidents. The success of this first legal action ever undertaken in the country on the issue, will depend on its appropriate implementation and the commitment by all authorities and stakeholders involved.

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Poster
#32

Egyptian Vulture New LIFE Project: "Urgent actions to strengthen the Balkan population of the Egyptian Vulture and secure its flyway"

Dima Obeidat
The Egyptian Vulture is a globally threatened species and over the last 30 years its population in the Balkans has declined by more than 80%, with no more than 70 pairs remaining. Therefore, institutions and organisations from 14 countries spanning the Balkans, Middle East and Africa have joined forces to protect this important species. All of them have united under the project "Urgent Actions to Strengthen the Balkan Population of the Egyptian Vulture and Secure Its Flyway", abbreviated to Egyptian Vulture New LIFE Project, launched in July 2017 with financial support from the EU's LIFE Programme. The period of implementation of the project is 5,5 years with an overall budget of € 5,848,458.
The project is working on securing adequate project management, monitoring and reporting through the following activities: (1) Establishing a Project Steering Group and a Project Team and making them operational; (2) Securing the technical & financial reporting; (3) Monitor the impact of the project activities on the target species and the conservation status of the SPAs and other project sites; (4) Assess the socio-economic impact of the project actions on the local economy and population; (5) Assess the project's impact on the ecosystem functions.
The project will reinforce the easternmost population of the Egyptian vulture in Europe by delivering urgent conservation measures towards eliminating major known threats in the breeding grounds and along the flyway. The project targets two key components: (1) Achieving a steady increase of the population on the breeding grounds in the Balkans; and, (2) Enhancing the context for conservation along the flyway and in the wintering grounds by minimizing loss of migrating birds, particularly mature individuals.

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Standard talk

Agrochemical poisonings of birds, including vultures, and predator-scavenger mammals in Kenya

Martin Odino and Darcy Ogada
Agricultural chemicals are widely used in Kenya to promote crop and livestock yields but also intendedly or accidentally kill wildlife especially birdlife in the farming fields as well as predators and scavengers involved in conflict with humans. We conducted random countrywide social surveys between 2007 and 2016 to determine level of agrochemical abuse as wildlife poisons. Additionally, during 2009 – 2010, we conducted active searches during field surveys to estimate avian mortality at a case poison-poaching hot spot site in western Kenya. Presently, we have been documenting anecdotal accounts from participants at our on-going rapid response to poisoning trainings in Laikipia starting 2017 and which upon verification we input in our database. Carbofuran, a nematicide-insecticide, traded as Furadan was found to be widely and easily available in Kenya until 2011. The pesticide was extensively abused as a biocide of problem animals to pastoralists as well as poison-hunting birds for human consumption, causing an estimated mortality of 40% of birdlife occurring at Bunyala Rice Plantation in Western Kenya. Carbosulfan nematicide-insecticide and whose trade name is Marshal was found to be the replacement of Carbofuran as a poison after 2011 in Masai Mara region where predator-associated human-wildlife conflict is rampant and was found responsible for poisoning predators and scavengers. Round-up herbicide has been reported to be a prominent poison especially to grazing animals in agro-pastoral landscapes especially in Laikipia and posing a threat to predators and scavengers. Another group of agro-chemical substances designated vermin killers that include Strychnine, Rat & Rat rodenticide and Fenthion are also variously of concern as poisons of predator-scavenger mammals and birds.

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Poster
#20

Environmental education for vultures – the case of Life Rupis in the Douro Valley

Vanessa Oliveira, Carlos Miguel Cruz, Américo Guedes, Luís Ribeiro, Ana Oliveira, Teresa Oliveira, Victor Casas

The Life Rupis project ("Conservation of the Egyptian Vulture and Bonelli's Eagle in the Douro Valley") (2015/19) has as main objectives the conservation of these species in the transboundary region of the Douro Internacional, Vale do Águeda and Arribes del Duero SPA, and to contribute for sustainable local development. Life Rupis is coordinated by the Portuguese Society for the Study of Birds, in partnership with Associação Transumância e Natureza, Palombar, the National Republican Guard, the Fundación Património Natural of Castilla y León, EDP Distribuição, the Vulture Conservation Foundation, the national Institute of Nature Conservation and Forestry and the Junta de Castilla y León, with co-financing from the European Union's LIFE program. Along with the conservation actions, there is also a set of actions of environmental education and communication. The Life Rupis School Program (started in the 2016/17) and the Festival ObservArribas (2017, 2018 and 2019) are some of the most relevant. The School Program has already reached more than 2000 students and 200 teachers from all ages on both sides of the border of the intervention area. Classroom activities and field trips allowed students to get to know the target species and the region better, the problems of their conservation, as well as technical equipment and methodologies in the area of Ornithology. Exhibitions of students works promoted the passage of their knowledge to others, including the visitors of ObservArribas Festival. Another of the components of the Environmental Education Program is teacher training, which has been carried out throughout the project, especially the long-term training in this school year (2018/19), in preparation for the post- Life.

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Key-Note

Conservation of Egyptian Vultures in eastern Europe – can population reinforcement compensate for diverse threats among continents?

Steffen Oppel, Volen Arkumarev, Vladimir Dobrev, Victoria Saravia, Elzbieta Kret, Anastasios Bounas, Dobromir Dobrev, Cloe Pourchier, Samuel Bakari, Rebecca Garbett, Joseph Onoja, Sharif Jbour, Nabegh Ghazal Asswad, Tareq Qaneer, Laith El Moghrabi, Maher Dayyoub, Mohamed Raouf, Mohammed Shobrak, Ghassan Jaradi, Mengistu Wondafrash, Alazar Daka, Stoyan Nikolov

Egyptian Vultures are the only long-distance migrants among European vultures, and are therefore exposed to threats along their entire flyway. The Balkan population is declining, but the magnitude and geographic range of threats that affect the species along its annual migratory journey are unclear. While several conservation activities to reduce poisoning and electrocution, supplementary feeding, and nest guarding are being implemented, the release of captive-bred birds has been proposed as a suitable approach to stabilise the population. However, it is unclear how many juveniles would need to be released to compensate for the various threats operating along the flyway. We established an alliance across 14 countries to assess the most important threats to Egyptian Vultures from breeding grounds on the Balkans to wintering grounds in Africa. While on the breeding grounds in the Balkans inadvertent poisoning appears to be the major threat, we found so far little evidence for widespread poisoning in either the Middle East or Africa, despite poisoning being a known major threat to vultures in Africa. Threats varied between eastern and central parts of the African wintering range. Electrocution on small and poorly designed electricity pylons near places with high food abundance appears to be the primary threat in Ethiopia, while direct persecution to meet market demands for belief-based use of vulture products appears to be the largest threat in Nigeria and neighbouring countries where vultures are specifically hunted to meet this demand. The major threat in the Middle East is shooting of birds, not due to market demand for belief-based use, but due to leisure hunting. Given these diverse threats affecting annual survival probability, we explored what changes in survival probability would be required to achieve a neutral or positive population trend over the next 10 years under various scenarios of population reinforcement. Using an integrated population model parameterised with count data from the Balkans since 2006, territory observations that yielded breeding success and adult survival probability from 93 territories, and satellite tracking from 27 juvenile Egyptian Vultures to estimate survival probability during the first four years, we simulated population trajectories 10 years into the future under different management scenarios. The model indicated that both juvenile (0.326; 95% CI 0.202 – 0.453) and adult annual survival probability (0.859; 95% CI 0.757 – 0.919) were too low for a stable population. As a consequence, releasing up to 6 captive-bred birds every year without any improvements in survival probability would not stabilise the population. Survival probability would need to increase by at least 8% for the population to stabilise by 2024 without any captive-released birds, whereas with 4-6 captive released birds per year the survival probability would only need to improve by 6%. While several opportunities exist to reduce threats

to Egyptian Vultures and other raptors along the eastern Mediterranean flyway, the conservation of this iconic species in eastern Europe cannot be achieved by management on breeding grounds but will require concerted efforts across three continents.

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Standard talk

Vultures in Portugal: an historical perspective

Carlos Pacheco, António Monteiro, Eduardo Santos, Otília Urbano, Samuel Infante
Currently 3 species of vultures breed regularly in Portugal: Eurasian Black, Griffon and Egyptian vultures and 3 more species have been recorded: Bearded, Rueppell's and White-backed vultures. Formerly the first 3 species were common and widespread in the country but suffered severe declines and became scarce (Griffon and Egyptian vultures) or even extinct as a breeder (Black vulture) on the 1970's. In recent decades, an incredible recovery of the Griffon vulture population took place while the Egyptian vulture showed continued moderate decline and is now apparently stable. After a few unsuccessful breeding attempts between 1996 and 2004, finally in 2010 a small breeding colony got settled and a couple pairs of Black vultures bred successfully. The number of pairs has been increasing regularly and currently there are 24 pairs distributed by 3 breeding colonies in the country. The Bearded vulture was apparently a scarce breeder that became extinct in the 19th century. After more than a century without records, a few dispersing juveniles from a reintroduction project were recorded in recent years. The other two species are African, being the White-backed a vagrant while the Rueppell's vulture is currently a regular species especially during autumn migration, and in 1999 the first breeding attempt in the western Palearctic was recorded. In this talk we give an historical overview of the distribution and abundance of the vulture species and address the reasons for the declines and recoveries observed and the future perspectives for the vulture populations is Portugal.

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Standard talk

Long-term knowledge of home range behaviour of territorial Bearded Vultures in Pyrenees through GPS monitoring: lessons to improve management actions

Juan M. Pérez-García, Ruth García-Jiménez, Antoni Margalida
Long term studies of threatened species' home range behavior may be very useful to understand the species' resource requirements, assess and predict impacts of human activities. This is the case of the Bearded Vulture (*Gypaetus barbatus*), a threatened species in the Western Palearctic that during the last century has reduced its spatial distribution and population size. The study of the home range behavior of territorial bearded vultures in Pyrenees let us to improve management actions aimed at increasing the distribution of this species and minimizing the risk of metapopulation extinction. To achieve this goal, we conducted a long-term monitoring using GPS tracking devices during 12 years to understand size, stability, sex segregation of home ranges, daily movements, territorial overlap between neighbour pairs, habitat use and effect of health policies. For this purpose, we tracked home range behaviors of 11 territorial bearded vultures occupying 9 different territories using satellite transmitters between 2006 and 2018. Territorial individual exploited home ranges of about 50 km2, characterized by pine forest and pasturelands. Territorials showed high home range stability between years (73% at K95%) with a low overlap with neighbour pairs (0.3% at K50% and 42% at K95%). Daily flight activity was regulated by external factors, as daylight index and season, while internal factors such sex, and breeding status module its flight dynamic. Sex differences in movements were detected, females moving greater distances than males, but being the area used by both individuals similar. Our findings show no differences between annual home range sizes and/or the time used for foraging either before, during or after the imposition of health regulations as consequence of Bovine Spongiform Encephalopathy disease. Our findings will help to develop guidelines for establishing priority areas based on spatial use, and also optimize management and conservation actions for this threatened species.

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Poster
#21

Retrospective study of causes of death on Griffon Vulture (*Gyps fulvus*) in Friuli Venezia Giulia, Italy, from the year 2012

Stefano Pesaro, Paola Beraldo, Fulvio Genero, Giacomo Rossi
The griffon vulture (*Gyps fulvus*) is one of the eight species of the Old World Gyps vultures found over a wide range from the Iberian peninsula in the west through the Balkans, Turkey, and the Middle East to India in the east. The specie has locally suffered a dramatic decrease caused by intoxication in particular from FANS, commonly used as a livestock anti-inflammatory drugs and from lead, used for hunting activity. On these basis health assessments, with intra vitam and post mortem analysis appear to have an important role for the conservation of the specie, understanding the health conditions of subjects in strict sense, but also wider of the colonies to which the vultures belong. This study describes the results of post mortem evaluation using anatomopathological, histological, parasitological and toxicological analysis performed on 5 subjects found dead from the year 2012 in nature and in captivity in one of the most important colony and scientific center for the conservation of griffon vultures from North Adriatic Sea Area to Northestern Alps. The most important results obtained by these analysis have been the high prevalence of kidney alterations found in four birds with different cause of death (lead intoxication, metabolic disfunction, electrocution) and the first description of Porrocaecum angusticolle as etiological agent of a severe parasitic enteritis in an adult griffon vulture.

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Poster
#22

Recent conservation specifics and related priorities in the conservation of vultures in Balkans, compared to Iberian Peninsula

Hristo Peshev, Emilian Stoynov, Atanas Grozdanov
Comparison of similar geographical areas in holding species populations based on socio-economic specifics may provide important answers and improve conservation planning and success. The relationship between wolves and vultures is rarely studied in Europe. Some authors report positive interactions, in which vultures benefit from the relationship by scavenging on the leftovers from wolves prey. More recent studies, however, have highlighted the potential danger to vultures from the man-wolf conflicts and the related use of poison baits. Due to these man-wolf conflicts, the sympatric presence of wolves can indeed have a negative effect on populations of vultures in Europe. We compared the spatial distribution and numbers of vultures and wolves on the Iberian Peninsula and the Balkans, and found large disproportions. Depending on the species, numbers of vultures are between 17 and 65 times higher in Iberia than on the Balkans. In turn, on the Balkans, wolves are twice more populous and occupy an area three times larger than in Iberia. In general, in Europe, the conservation of vultures in areas where wolves are present has proven complicated and has rarely ended in success, with vultures surviving or thriving mainly outside areas with high wolf distributions. Conversely, in areas where wolves and vultures are both present, the threat of illegal poisoning must be buffered. A good solution for achieving stability or even a slight increase in vulture populations in Balkans, having in mind the frequently conflicting with man carnivore guild (wolf, bear, jackal and to lesser extent fox and lynx, and the huge number of stray dogs) is to maintain permanent vulture feeding stations, which should be central places in Vulture Safe Areas, where full spectrum of complex conservation measures to be applied and intensive monitoring (i.e. early warning system using GPS tracking of griffon vultures) to be set in motion.

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Speedy talk

Factors effecting movement and foraging behaviour of the critically endangered African White-backed vulture in Southern Tanzania

Natasha Peters, Corinne Kendall, Colin Beale, Claire Bracebridge
Poisoning is a significant threat to vulture populations. White-backed vultures have very large individual home ranges, often including non-protected areas and human settlements, and population declines and poisoning occurrences are both greater outside protected areas. Because it is efficient and silent, most poisoning incidents are never found or reported making the true impact on populations difficult to quantify and mortality may be greater than previously estimated. Immediate and effective poison response activities can reduce the probability of extinction to zero, and protected area staff response has already shown decrease in poison-related mortalities. Information on factors influencing foraging would improve the ability to predict vulture movement, which will help conservationists anticipate how the birds might encounter threats or respond to changes in food resources. We analysed the movements of 26 vultures, primarily White-backed vultures, tagged with ARGOS GPS units to determine vultures' foraging decisions and how this affects their risk of poisoning. We accomplished this using Hidden Markov Models to classify different behavioural states from the movement data and determined which environmental variables are most influential in decision making. We went on to use Point Process Modelling to analyse spatial predictors of foraging behaviour such as protected area status, livestock densities, and breeding status. We used these results to estimate risk of poisoning. We found that factors most likely to influence foraging behaviour were time of day, with more foraging occurring in the early morning, and protected areas with high thermal forming capabilities. These data can be used to highlight important areas to patrol for threats to prevent further vulture declines.

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Speedy talk

Movements and space use of Egyptian Vultures tracked from the Douro Valley, Spain--Portugal to the Sahel: the challenge of insecurity

Louis Phipps, Franziska Loercher, José Pedro Tavares, José Pereira, Eduardo Realinho, Lubomir Peske, Julieta Costa, Joaquim Teodosio, Isidoro Carbonell Alanis, António Monteiro et al.

The Egyptian Vulture *Neophron percnopterus* population in Europe has declined by 50-79% in the last 40 years and is listed as Endangered on the IUCN Red List and faces multiple threats (e.g. poisoning; food shortages; electrocutions; and collisions) which vary in intensity across the breeding and wintering ranges and along the migration routes. The LIFE Rupis project aims to implement actions to strengthen the Egyptian Vulture population in the Douro Valley trans-border region of Spain and Portugal, a current stronghold for the species with 135 breeding pairs. Here we present the results from two years of GPS tracking nine individuals (five breeding adults; one non-breeding adult; a sub-adult; two juveniles) from the breeding grounds in the Douro Valley, across the Strait of Gibraltar migration bottleneck, to their winter ranges in the West African Sahel. Of the eight vultures that migrated to Africa in 2017 (one juvenile overwintered in Extremadura, Spain), one juvenile was assumed to have died in southern Morocco while all of the adults and the sub-adult travelled to southern Mauritania and Mali (covering >3,200 km in 12-16 days). The five breeding adults traversed extensive winter ranges (median 95% kernel density contour = 19781 km2; range = 12819-42791 km2) compared to their summer ranges (median 95% kernel density contour = 139 km2; range = 36-481 km2), and favoured savannah-type habitats with the presence of livestock during both periods. Although the sub-adult vulture repeatedly used a protected area in southern Mali, the majority of the vultures spent the winter periods in overlapping core ranges in the insecure and unprotected cross-border regions between Mali, Senegal and Mauritania. These findings illustrate the vulnerability of Egyptian Vultures along their migration route and in their winter ranges, and support calls for a “flyway approach” to Egyptian Vulture conservation in Western Europe and Africa.

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Poster
#23

Estimating Griffon Vulture (*Gyps fulvus*) population abundance from simultaneous winter counts at roosts

Antonello Pascazi, Samuele Spacca, Giancarlo Opramolla, Filippo La Civita, Mario Romano, Luciano Sammarone, Mario Posillico

Population size of large raptors is difficult to estimate, and not surprisingly this figure is usually surrogated by counts of breeding pairs, which are easiest to obtain although accounting only for a segment of the whole population. However, population abundance is a key information for both conservation and management purposes as well as for scientific purposes, e.g. estimating probability of population persistence or minimum viable populations. We took advantage of the gregarious roosting behaviour of griffon vultures and of their fidelity to communal winter roosts, to perform simultaneous winter counts at 5-6 roosts from 2015-2016 to 2018-2019 in the central Apennines griffon vulture range. Simultaneous counts have been temporally replicated on 4 to 5 independent occasions during each sampling season from mid-December to early-February. The resulting raw number of observed vultures, which could provide an index of yearly population abundance, has been modelled in an N-mixture models framework to estimate vulture abundance, hence taking into account imperfect detection of vultures. Estimated population abundance varied from 259 vultures in 2015-2016 to 306 vultures in 2017-2018, according to base models with no covariates. Reasonably low standard errors and largely overlapping 95% confidence intervals of abundance estimates suggested that population abundance remained stable from 2015-2016 to 2018-2019, differently from breeding population trend which was significantly increasing. Further refinement of population abundance estimation, e.g. including meaningful covariates in N-mixture models, could improve our estimates increasing precision and providing guidelines to efficiently apply modelling techniques to raw counts.

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Poster
#34

Population viability analysis of the Eurasian Griffon Vulture (*Gyps fulvus*) population in central Italy

Marcello Bizzarro, Rosario Balestrieri, Giancarlo Opramolla, Luciano Sammarone, Mario Posillico

Griffon vulture has been reintroduced in the central Apennines from mid-90s to early 2000s and, since then, reproductive population size slowly increased. However, this population is threatened by poisoning (two known mass poisoning occurred in 1998 and 2007 in addition to a higher than average mortality rate in 2011), and an almost complete breeding failure in 2009 has been recorded. New potential threats, like the use of non-steroidal anti-inflammatory drugs to medicate livestock, could be detrimental to the persistence of such population. Accordingly, we explored, in a population viability analysis framework, the effect of different levels of carrying capacity, mortality increase, breeding failure and frequency of stochastic events on the probability of griffon vulture persistence in the central Italian Apennines. Biological, environmental and demographic parameters, such as age-class distribution, mortality rate, breeding success, came from a twenty-year monitoring database, other variables being quantified from literature. With reference to known or likely occurring and forthcoming threats, eight scenarios have been formulated. In particular, two scenarios predicted a two-fold increase in the magnitude of catastrophic events affecting reproduction and mortality; two scenarios foresee a 10% and 20% increase in mortality of all age-classes; two scenarios predicted a 10% and 20% decrease in reproductive rates. The last two scenarios predicted an overall variation of carrying capacity at 50% and 150% of its base value. Simulations show a generally low extinction probability for most of the simulated scenarios, except for the ones in which mortality is increased by 20% where the extinction probabilities were 22% in 100 years, and catastrophic events causing a two-fold increase in mortality. In the latter case extinction probability raised to 38% in 100 years. As a result, management efforts should therefore be aimed at decreasing the impact of mortality, more than significantly increasing carrying capacity alone.

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Standard talk

Vision, foraging and collision in raptors

Simon Potier, Olivier Duriez, Francesco Bonadonna, Almut Kelber
Raptors are believed to rely mostly upon vision for their daily tasks. Especially, the fact that some species can fly at high altitude, such as old-world vultures, have led scientist to consider that raptors have extraordinarily sharp eyesight. However, in the light of the high number of collision with human devices, one can wonder about the visual sense of these species. Here I will be to summarize the updated knowledge on the visual sense in raptors, focusing on the difference between scavengers and predatory species. Especially, I will present a review of data about the visual acuity, contrast sensitivity and visual fields. We will see how these visual specializations may be linked to foraging strategies, but may also help us to understand why these birds collide with human device. Indeed, while we all live in the same place at the same time, we all live in a different environment because of our different ways to perceive it. Therefore, if we want to understand why birds collide with human devices that are clearly visible for a human eye, and if we want to reduce this mortality, it is essential to understand how they perceive their world.

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Poster
#30

Vulture research and conservation in Niger

Cloé Pourchier, Thomas Rabeil, Abdoul Razack Moussa Zabeirou
As in most Africa, vultures used to be widely present in Niger, but their populations have declined significantly and are now mostly concentrated in protected areas. However, few monitoring and conservation activities had been carried out in the country and the current knowledge related to the avian scavengers is quite limited to implement tailored conservation actions. Identified as important wintering ground for the Eastern European population of the Egyptian Vulture (EV) (*Neophron percnopterus*), Niger was included in the EV NEW LIFE project (LIFE16 NAT/BG/000874), which aims at strengthening the Balkan population through urgent conservation measures in the breeding grounds and along the flyway. The work done by the Sahara Conservation Fund (SCF) has until now mainly been focused on investigation of threats and their social context. As a result, illegal killing for belief-based use was proven to be the major threat for vultures in Niger. Apart from the pressure put by the high demand for vulture parts in Nigeria- neighbouring country- local markets where these products are offered were also identified. Monitoring of the EV resident population was also conducted and new settlement areas, including breeding territories, were identified. Awareness-raising activities with local stakeholders have been launched and will be intensified. In addition, SCF has been leading monitoring activities on Lappet-faced (Torgos tracheliotos), Rüppell's (Gyps rueppellii) and White-headed vultures (Trigonoceps occipitalis). The study focused on their reproduction and nest monitoring to evaluate the rate of breeding success and understand the evolution of nest selection. This presentation by showing the activities and results obtained by SCF aims at giving an overview of the progress made in Niger. The efforts deployed were successful as unprecedented results have been obtained, building-up on our knowledge regarding vultures in the Sahelo-Saharan region, and will be critical to the development and implementation of efficient conservation programmes.

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Standard talk

Assessment of the potential recovery of a reintroduced species, the Cinereous Vulture in France, by modelling the breeding habitat suitability

Typhaine Rousteau, Olivier Duriez, Jean-Baptiste Mihoub , François Sarrazin
Reintroductions are an important tool for re-establishing viable populations of threatened and endangered species that are self-sustainable over the long term. In addition, assessing the success of reintroduction programs only makes sense once the restored populations would be regulated. Therefore, quantifying potential suitable habitats is needed for anticipating the carrying capacity to be expected in the regulation phase. Species distribution model is a common approach in ecology to identify the species environmental niche and to project potential suitable habitat over space. Here, we used ecological niche models using presence-only data to determine the breeding habitat suitability of cinereous vultures in order to evaluate the recovery potential of three reintroduced populations of that species in France. We used the presence of 126 nest sites identified between 1996 and 2017 and a set of 12 environmental variables at various spatial scales (from local to home range scale). We aimed (1) to quantify the availability of the breeding habitat for the species in France to derive a proxy of the carrying capacity to be expected in the reintroduced populations, (2) to identify the most important ecological factors shaping habitat suitability of the species, (3) to better target the monitoring of potential new breeding sites, (4) to explore further projections at European scale, and (5) to focus conservation management efforts adaptively. The slope is the most important predictors of breeding habitat in cinereous vultures, the steeper areas being less accessible to human remaining less disturbed anthropic activities. Our results are in accordance to previous studies across Europe and provide essential information to assess project outcomes of the reintroduction projects with respect to the viability of the (meta)population at national level.

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Standard talk

California Condor nest management in Southern California

Estelle A. Sandhaus, David Meyer, Joseph C. Brandt, Molly Astell, Nadya Seal Faith, Erin Arnold

California Condors were first reintroduced to southern California in 1996 after a period of extinction in the wild. Reintroduction of this cathartid vulture has continued in this and other parts of the former range, and the world population today nears 500, with over sixty percent of the birds flying free. However, none of the populations are yet self-sustaining. Lead poisoning remains the most significant mortality factor for all wild flocks, and population growth is maintained through release of captive-bred individuals and intensive management of each flock (Finkelstein et al., 2012; USFWS 2019 unpub). Low nest success, largely due to anthropogenic factors, including microtrash ingestion, had also been a limiting factor of the southern California population's growth since the onset of breeding in 2002 through 2006. In response, the Santa Barbara Zoo and United States Fish and Wildlife Service initiated a formalized nest management program in 2007. A two-pronged approach of monitoring and intervention has facilitated adaptive management while increasing nest success. Here we present the methodology and results of twelve years of systematic nest management in this population, including an increase in apparent nest success from a 2002-2006 mean of 6.5-12% (Mee et. al., 2007) to a program mean of 53% (2007-2018), above that of the historic and recent historic populations.

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Standard talk

Priority areas for conservation of Old World vultures

Andrea Santangeli, Marco Girardello, Evan Buechley, Andre Botha, Enrico Di Minin, Atte Moilanen

The prosperity and well-being of human societies relies on healthy ecosystems and the services they provide. However, the biodiversity crisis is undermining ecosystems services and functions. Vultures are among the most imperiled taxonomic groups on Earth, yet they have a fundamental ecosystem function. These obligate scavengers rapidly consume large amounts of carrion and human waste, a service that may aid in both disease prevention and control of mammalian scavengers, including feral dogs, which in turn threaten humans. We combined information about the distribution of all 15 vulture species found in Europe, Asia, and Africa with their threats and used detailed expert knowledge on threat intensity to prioritize critical areas for conserving vultures in Africa and Eurasia. Threats we identified included poisoning, mortality due to collision with wind energy infrastructures, and other anthropogenic activities related to human land use and influence. Areas important for vulture conservation were concentrated in southern and eastern Africa, South Asia, and the Iberian Peninsula, and over 80% of these areas were unprotected. Some vulture species required larger areas for protection than others. Finally, countries that had the largest share of all identified important priority areas for vulture conservation were those with the largest expenditures related to rabies burden (e.g., India, China, and Myanmar). Vulture populations have declined markedly in most of these countries. Restoring healthy vulture populations through targeted actions in the priority areas we identified may help restore the ecosystem services vultures provide, including sanitation and potentially prevention of diseases, such as rabies, a heavy burden afflicting fragile societies. Our findings may guide stakeholders to prioritize actions where they are needed most in order to achieve international goals for biodiversity conservation and sustainable development.

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Poster
#25

Poison against predators: a conflict without solution?

Victoria Saravia, Dimitris Vavylis, Haritakis Papaioannou, Elzbieta Kret, Eleftherios Kapsalis, Theodora Skartsi, Alexios Giannakopoulos, Yorgos Iliopoulos, Panagiotis Kordopatis
The illegal use of poison baits has been identified as one of the main causes of mortality and decrease of vulture populations across Europe, while the predator-human conflict is usually singled out as the most important driver behind it. Greece is no exception, where the practice is deeply rooted in the rural communities' attitude and approach regarding losses in livestock and game allegedly caused by wildlife. While actions at policy level and law enforcement are key to address this illegal practice - receiving most of the attention, resources and efforts-, so are actions involving prevention and awareness increase at a local community level. In this line, through two LIFE projects for the Egyptian vulture (LIFE10NAT/BG/000152 & LIFE16NAT/BG/000874), two conservation NGOs are working directly with local communities (in Epirus, Thessaly and Thrace) and testing a combination of approaches aiming to decrease the use of poison. On the one hand, a network of over 200 stakeholders –both land users and local authorities- with increased awareness and sensitivity towards the problem of wildlife poisoning was created. On the other, stockbreeders are being provided with both traditional and innovative tools targeting the mitigation of livestock losses caused by large carnivores, hence decreasing wildlife conflict. From October 2017 to March 2019 over 50 puppies of local races of sheepdogs, perfectly adapted to the Greek countryside conditions, have been distributed among stockbreeders suffering wolf and bear attacks. Moreover, sheepdogs also receive proper veterinary care. Additionally, apart from electric fences, an improved version of the fladry method -not used in Greece until now-, was developed particularly for transhumant stockbreeders in order to protect their flocks from wolf attacks. An assessment of the results will be composed at the end of the project (2022) to evaluate whether wildlife conflict can be mitigated through this combination of legal methods.

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Key-note

Restoration and conservation of scavenger populations

François Sarrazin
The restoration and conservation of avian scavengers has long been at the forefront of concern and action for biodiversity worldwide and particularly in Europe. Indeed, vulture reintroductions were initiated in Europe and played a significant role in reversing the conservation status of Griffon, Bearded and Black vultures. These first programs were set up before international translocation guidelines became available but their relevant implementation designs and their accurate long-term monitoring significantly influenced the development of these standards. Documenting reintroduction feasibility and release strategies as well as monitoring the fates of founders and subsequent generations within and between programs allowed to discriminate generic processes from these local initiatives. Such information contributed to enhance reintroduction practices worldwide as well as the knowledge of vulture's biology and ecology including behavior, demography and genetics. Similarly, restoring viable vulture populations in human-dominated landscapes challenged social innovation to reverse negative perceptions and restore recycling function on wildlife and livestock. Up to now, these approaches have been resilient to European sanitary crises due to the dedication of vulture conservationists. These outstanding achievements clearly justify profound acknowledgement and gratitude to the pioneers and the growing community of actors involved in these projects. Nevertheless, ongoing and future challenges remain. Measuring the success of these programs thus requires clear definitions and criteria that must rely on at least partly shared objectives and indicators. This implies explicit ethic debates about the ultimate motivations behind these actions, from species recovery or ecological restoration to rewilding. In a fast-changing world, vulture conservation has moved from mostly aesthetic and patrimonial values to ecosystem services but these anthropocentric arguments can be enriched with non-anthropocentric views embracing the evolutionary future of non-humans. Long term vulture conservation and restoration in Europe thus remain key to major transitions shaping human and non-human's trajectories in, and perhaps beyond, the Anthropocene.

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Key-note

Vultures foraging movements as a mixed strategy and their dependency on social information

Orr Spiegel, Roi Harel, Ohad Hatzofe, Wayne M. Getz, Ran Nathan
The need to obtain food is a critical driver of animal movement that shapes individuals' survival and fitness. When searching for new items or revisiting familiar ones, foragers have to cope with uncertainties regarding food location and quality. Their movements reflect trade-offs between perceived costs (e.g. energy, time and missed opportunities) and expected benefits (energy intake) and the effect of various factors. External factors include environmental conditions and the presence of others that can act as competitors or facilitators. Internal factors are often harder to investigate and include the motivation (e.g. the level of hunger), locomotion capacities and the information forages have. Together, these factors result in space use patterns that vary across time, space, species and individuals. Here I will try to demonstrate how these different factors shape vultures' movement, using GPS tracking data of Lappet-faced vultures (LFV, Torgos tracheliotus) and White-backed vultures (WBV, Gyps africanus) from Etosha national park, Namibia and of Eurasian griffon vultures (EGV, *Gyps fulvus*) from Israel. Comparing WBV and LFV search efficiency showed that the latter were superior in finding food thanks to differences in morphology (namely visual acuity and wing-loading) and in their social dispersion (different roost arrangements). Identifying feeding events from accelerometer data of EGVs allowed us to estimate hunger level, suggesting they use a mix strategy of maximizing food intake and minimizing energy expenditure. Simultaneous tracking of multiple individuals with complementary data on food provided as feeding stations allowed us to demonstrate the importance of EGV's roosts as information centers. Uninformed individuals could follow informed ones when they revisit carcasses and although they differed in their tendencies to be informed or uninformed, they all occasionally profited from following others. These findings show a flexible, non-monotonic response of free-ranging wild animals to increasing hunger levels and provide mechanistic explanations for interspecific variation in search efficiency for species using similar resources and foraging modes. They also demonstrate the facilitative effects in foraging vultures across and within species, and the emphasize that individuals in declining populations may suffer from reduced foraging efficiency.

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Standard talk

Long range forays by three vulture species- optimal foraging or failed attempts of breeding dispersal

Orr Spiegel, Roi Harel, Alejandro Centeno-Cuadros, Ohad Hatzofe, Wayne M. Getz, Ran Nathan

Animals move from various reasons (e.g. finding food or mates), resulting in complex, state-dependent patterns that vary among species, habitats and individuals. Linking these observed patterns with their underlying processes is essential for understanding the biology of the species, and for effective conservation. To investigate factors shaping vultures' movement we tracked Lappet-faced vultures (Torgos tracheliotus) and White-backed vultures (Gyps africanus) at Etosha national park, Namibia and Eurasian griffon vultures (*Gyps fulvus*) at Israel. We deployed high-resolution GPS-accelerometer (ACC) tags, accompanied with behavioural, genetic, and morphological data. The ACC data, for instance, allowed us to identify feeding events, thus estimating a proxy for individuals foraging performance in situ. We found that routine foraging movements were typically confined within tens of km from main roost(s). Yet, individuals from all three species exhibited long-range forays (LRFs). These LRFs were rare, short-term, large-scale circular journeys that greatly exceed their typical foraging range (reaching up to 1700 from home). Lower foraging rates during LRFs and unfavourable wind conditions dis-qualify optimal foraging as a plausible explanation for these journeys, and population genetic structure was also not supported as an alternative explanation. During LRFs vultures showed very low roost fidelity, even after reaching their destinations. Thus, the hypothesis that LRFs represent failed breeding dispersal attempts to find mates remains our most plausible explanation at this time. We conclude that vulture's movement reflect distinct behavioural states and that inference about the mechanisms underlying animal movements should be confronted with complementary data allowing testing of multiple competing hypotheses.

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Poster
#26

Colony-shifting and intra-colony nest movements of Eurasian Griffons (*Gyps fulvus*) in a period of 15 years

Goran Susic, Saša Marinković, Irena Hribsek
Eurasian Griffon is social, colonial cliff-nesting raptor.The accepted definition of a colony is: „a place where a number of individuals or pairs nest or regularly roost at a more or less centralized location from which they reccurently depart in search of food“ (Wittenberger and Hunt 1985). Several authors (for example Sarrazin et al. 1996, Lopez-Lopez et al. 2004, del Moral 2009, Demerdzhiev et al. 2014) agree that a Griffon's nesting cliff is considered as acolony when is occupied by at least two pairs, at a distance of at least one kilometer from the neighboring occupied cliff. Eurasian Griffon's population surveys were conducted during 15 years (2000-2014) in Kvarner Archipelago (Croatia) and Uvac area (Serbia) to document the population structure, including colony occupancy. During that period the number of abandoned sites and colonization of new ones was recorded. It is well known that vultures of the genus Gyps very often desert their traditional sites and shift into new locations, as in Botswana (Borello and Borello 2002) or on Crete (Xirouchakis and Mylonnas 2005). The cause of „colony switching“ (Piper 2004) remains unclear as sometimes optimal sites may be abandoned whereas others with low breeding success may be occupied.
In Croatia, there was a high annual turnover of nest sites within a colony and large-scale shifting of active nests between colonies. Human disturbance, intraspecific competition, and food availability could not explain the abrupt abandonment of their traditional cliffs in Croatia, as they „saturate“ the same cliffs (even the same nest-sites) after a certain number of years. In Serbia, in some cases, colony shifting could be attributed to human disturbance and in others to extremely bad weather condition during the beginning of the breeding season, but there are some cases which could not be explained by either faktor.

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Standard talk

Life Rupis – Conservation of Egyptian Vulture and Bonelli's Eagle in the Douro Valley

Joaquim Teodósio, José Tavares, José Pereira, Miguel Nóvoa, Ana Martinez, Isabel Cerveira, António Monteiro, Carlos Pacheco, Carlos Rochinha, Nuno Santos, Alice Gama, Vanessa Oliveira, Julieta Costa

The Douro river has carved a monumental canyon along the border between Portugal and Spain. The canyon's towering, granite cliffs are a refuge for several threatened bird species. To bolster populations of Egyptian Vulture and Bonelli's Eagle in the Douro region, project Life Rupis is working to reduce their mortality and to improve breeding success. At the same time, we work closely with local people to spread the love of the region's natural value. Project Life Rupis aims to preserve Bonelli's Eagles, Egyptian Vultures and other raptors in the Douro canyon, spanning protected Natura 2000 areas on both sides of the border: Douro Internacional Natural Park in Portugal and Arribes del Duero Natural Park in Spain. Running from 2015 to 2019, the project promotes the region's biodiversity and sustainable development.

Protecting eagles and vultures by:

- Creating poison-detection squads with law enforcement authorities
- Correcting or dismantling dangerous electricity lines
- Increasing food availability
- Studying breeding populations, migratory movements and feeding habits
- Supporting free-range livestock rearing
- Promoting nature-friendly land-use
- Working with schools and relevant sectors to highlight the region's natural heritage
- Promoting local products and services and their relationship with nature conservation
- Creating cross-border management and action plans for Egyptian Vulture and Bonelli's Eagle
- Creating best-practice guideline

By developing species management plans, expanding the area covered by the Natura 2000 Network in the region, and producing best-practice guides, we ensure the project has a lasting legacy. And by promoting new events and environmentally-friendly practices from farming to tourism, we contribute to a sustainable future for this stunning region.

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Poster
#33

Status, population recovery and conservation of the Black Vulture *Aegypius monachus* on Mallorca

Evelyn Tewes, Pep Tapia, Jordi Muntaner
At the beginning of the 80ies the Black Vulture on Mallorca, last existing island population, was on the point of extinction. In a joint effort by the Black Vulture Conservation Foundation (BVCF) and the local administration a recovery program was designed and carried out. The population increased from only 19 birds left in 1983 to about 123 in 2008 when the last census of individuals has been carried out. The number of breeding pairs increased from 1 pair in the early 80ies to about 37 at present. The population status has been changed from endangered to vulnerable in 2004. The numbers of nestlings hatching and fledging each year continue to increase in spite of the new population of Griffon Vulture on the island and threats as increasing disturbance in the breeding areas. The development of population, threats and conservation measures during the past 35 years will be presented.

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Poster
#27

Pathomorphological investigation and the causes of deaths in 2018 – 2019 as a step in protection and conservation of Griffon Vultures (*Gyps fulvus*) population in Croatia

Marina Tišljar, Marko Modrić, Hrvoje Capak, Stjepan Brzica, Adela Krivohlavek, Borka Šimpraga, Fani Krstulović, Krešimir Severin, Lucija Šerić Jelaska, Lana Bakulić, Vladimir Savić, Relja Beck, Vedran Lucić

Griffon vulture (*Gyps fulvus*) is the only one of four vulture species living in Europe and remaining a strictly protected species in Croatia. In spite of continual and hard work on the vultures protection and conservation, various threats such as (un)intentional killing/disturbance (shooting, harassment, (un)intentional poisoning); electrocution and collision with power lines (or at wind farms); collision with vehicles; lack of food availability and drowning, still represent (at least apparently) the primary causes of their death. Encouraged by the results of toxicological examinations in other species of wild birds (confirmation of chronic bird poisoning by lead in birds having died of trauma), the determination of the causes of diseases and deaths in the griffon vultures (Beli Visitor Centre and Rescue Centre for Griffon Vultures, Cres, and Public institution PRIRODA, Rijeka, /predominantly Kvarner Islands/) began in 2018, using systematic X-ray and macroscopical and miscroscopical pathomorphological examinations followed by toxicological and microbiological (bacteriological, virological and parasitological) investigations, and molecular entomological research (mainly for the estimation of the postmortem interval (PMI)). In seven (77.77%) out of nine investigated carcases found in the sea, changes were found to be characteristic of drowning. In two of seven, X-ray findings were typical of lead ammunition. Acute lead poisoning was confirmed in a female bird having died after a short period of lameness (densities on abdominal X-ray indicated ingested lead content; 40 mg/kg lead in the liver). In one bird typical signs of electrocution were confirmed.

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Standard talk

How can the use of turbine shutdown on demand and radar reduce the risk of collision for vultures in wind farms

Ricardo Tomé, Nadine Pires, Alexandre H. Leitão, Filipe Canário, Ricardo Oliveira
Vultures are known to suffer from collision mortality in wind farms in Europe and especially in the Iberia Peninsula. In the Southwest of Portugal, a region densely populated with wind farms due to its wind energy potential four different species of vultures occur regularly during autumn migration and post-breeding dispersal periods. Griffon Vulture *Gyps fulvus* is the most abundant species, with more than 2000 individuals (3.5 % of the European population) occurring yearly, while Egyptian Vultures are also frequent (approximately 70 individuals, representing over 1 % of the estimated European population). The largest individual wind farms in the area (the BSJ wind farm, comprising 25 turbines) was built under the condition of conducting a thorough bid monitoring program since the pre-construction phase and of implementing a RASOD "Radar Assisted Shutdown On Demand" mitigation measure to avoid collisions. We present the results of these programs during the operational phase of the wind farm (2010 - 2018) showing that: i) the number of vultures occurring after the construction of the wind farm did not change significantly, neither the main routes used by the birds; hence, several hundreds of vultures incur in very high collision risk yearly, crossing the wind farm at collision risk height and at reachable distance by the turbines blades; nevertheless there was zero mortality of vultures due to the implantation of RASOD; the impact of such mitigation measure in energy production was negligible.

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Poster
#28

Population status of the Egyptian Vulture (*Neophron percnopterus*) in Albania

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Egyptian Vulture (*Neophron percnopterus*) represents the only vulture species that it is still breeding in Albania. Literature suggests that in the 20th century it has bred almost all over the country, whereas nowadays its breeding distribution has shrank to an area of around 1500 square km, situated in the southern Albania, mainly along the Vjosa River basin. The national population of the Egyptian Vulture has declined with around 80% over the last 35-40 years. Nowadays, Albania shelters 5-10 breeding pairs or 7-14% of the Balkan population of this species. Results from the 2018 monitoring season confirmed nine breeding territories, five occupied by pairs and four by single birds. This shows more or less stable population in the country since 2013. However, the main threats for the Egyptian Vulture in the Balkans operate also in Albania. Secondary poisoning, through poison baits targeting the large and medium size carnivores, such as the Grey wolf (Canis lupus), the Red fox (Vulpes vulpes) and the Golden jackal (Canius aureus) is assumed to be the main threat for the species at national level. In addition, electrocution even though not investigated might also be a serious threat considering the presence of dangerous electricity infrastructure within the breeding territories of this species in Albania. The use of agrochemicals and veterinary medical products appears to be less problematic based on the information gathered so far, however further research is needed on these and the other mentioned threats.

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Speedy talk

Terrasse Plan: a multispecies recovery, conservation and monitoring plan for the Balearic Island raptors

Carlota Viada and Joan Mayol
In 2019, a multispecies recovery, conservation and monitoring plan for all diurnal raptors has been prepared by SEO/BirdLife to the Regional Government of the Balearic Islands. It focuses on the catalogued species, namely Milvus milvus and Aquila fasciata listed as Endangered and *Aegypius monachus*, *Neophron percnopterus* and Pandion haliaetus as Vulnerable. The current conservation status of the five listed species is favourable, although their populations are considered fragile and have to be under surveillance conservation measures to ensure its viability. The goal of the plan is to keep the diurnal raptor community of the Balearic Islands in a favourable conservation status and to remove the five-catalogued species out of the threatened categories. Demographic targets were also set for a 10 years scenario:
- Milvus milvus: Increase up to 150 pairs in - Mallorca and to 75 in Menorca
- *Neophron percnopterus*: Maintain the population in Menorca (50 pairs) and Mallorca (1-2 pairs)
- *Aegypius monachus*: Increase in Mallorca up to 60 pairs.
- Pandion haliaetus: Increase total population up to 35 pairs, with 7 pairs in Menorca, 4 in Ibiza and its further recolonization in Formentera.
- Aquila fasciata: Reach a population of 15 pairs and natural recolonization of Menorca.
Operative objectives have been set to increase their survival rates and productivity. In addition, specific measures devoted to migratory raptors, to population monitoring, participation, coordination and dissemination have been also defined. The plan establishes implementation mechanisms and makes an initial estimate of costs for the first five years of application, which stands at around 822,000 euros. The plan was named ‘Terrasse Plan” to honour Michel Terrasse, one of the pioneers in the active conservation of birds of prey in Europe, that has also left a very significant footprint in the Balearics.

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Poster
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Age and season-related habitat selection patterns of the Bearded Vulture (*Gypaetus barbatus*) in the Swiss Alps: a basis for predicting conflict zones with wind energy construction

Sergio Vignali, Daniel Hegglin, Raphaël Arlettaz, Veronika Braunisch
Climate changes and the increase in energy demand are driving a worldwide transition towards a fossil-free energy production, in which the wind energy is playing a major role. Without a meticulous spatial planning of the wind power facilities, the development of the wind energy industry could negatively affect several species, especially large soaring raptors. After its extirpation from many European countries, the bearded vulture is now slowly spreading in the Alps thanks to an ambitious international reintroduction program. This successful project, however, may be jeopardized by the spreading of wind farms in the alpine massif. We conducted a study to predict the potential distribution of the bearded vulture across the Swiss Alpine range using the maximum entropy modelling approach and testing for differences between two different age classes (adult and juveniles) during the cold and the warm season separately. Model complexity was tuned in a stepwise fashion by varying hyperparameters combinations and selecting the settings that performed best (according to the AUC value) on a testing dataset. The resulting models had a high accuracy in predicting habitat suitability (testing AUC ≥ 0.829) in each season for both age classes. Adults and juveniles showed different seasonal habitat selection patterns: whereas for juveniles the distribution seems to be mainly driven by the food availability (ibex density percent contribution: 25.1% in summer and 11.6% in winter), climatic conditions were more important for adults (average precipitation percent contribution: 15.6% in summer and 28% in winter). When considering both age classes, 41% of the Swiss Alpine range offered suitable habitat for the species, with range shifts between the cold and warm season. This analysis shows the habitat selection patterns of the species and predicts its potential distribution and thus allows identifying areas of potential conflict with wind energy production.

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Speedy talk

Bearded and Griffon Vultures in Germany - Possibilities of Bavarian conservation supports for the Eastern Alps

Toni Wegscheider and Henning Werth
In its latest feasibility study, the Landesbund für Vogelschutz (LBV) examined the framework conditions for supportive measures of bearded and griffon vultures in the Eastern Alps - in particular which measures were to be pursued in the Bavarian Alps. First, the historical data on the occurrence of both species of vultures in Germany were evaluated, as well as observation data of the past years. The bearded vulture showed a clear concentration of sightings in the area „Allgäuer Hochalpen“, which accounted for about 2/3 of all German sightings. While bearded vulture sightings were mainly in winter, sightings of griffon vultures were made almost exclusively in summer - but in a much larger area spread over several federal states. The length of stay of the vultures was - except for individual individuals - limited to a few days. Although the risk factors for bearded vultures in the Bavarian Alps are currently considered low, there are unfortunately still massive problems beyond the state border (persecution and indirect poisoning by the use of lead ammunition), which have already repeatedly led to a sudden disappearance of birds in the neighboring Tyrol. For these reasons, no successful breeding could be achieved there so far. It is planned together with suitable actors a cross-border information campaign for the protection of the Bearded Vulture, v.a. to initiate the use of lead-free ammunition, as well as to improve monitoring of Bearded vultures in the border area. For release of bearded vultures, the area „Berchtesgaden National Park“ with the neighboring Austrian province of Salzburg would be the most suitable in bavaria. Appropriate preparatory measures are planned. In general, the LBV feasibility study shows that the handling of carcasses in Germany must be further discussed. Bearded and griffon vultures would be suitable sympathizers for successful public relations work.

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Standard talk

Long-term trends in population size and breeding success of Endangered Cinereous Vulture in Dadia-Lefkimi-Soufli Forest National Park, NE Greece

Theodora Skartsi, Sylvia Zakkak, Petros Babakas, Dimitris Vasilakis, Jose Elorriaga, Athanasios Chalivelentzios, Ioannis Tziambazis, Konstantinos Poirazidis

The Dadia-Lefkimi-Soufli Forest National Park, located in NE Greece, hosts the only Cinereous Vulture breeding population in the Balkan Peninsula. Since 1979, when the population was found on the brink of extinction, consecutive counts took place, in order to assess the population status. In 1994 systematic annual monitoring of the species' breeding success was initialized, to better understand the population's needs and evaluate the effectiveness of implemented conservation actions. Monitoring took place from January to September, in four stages, during which nest occupancy, incubation, hatching and fledging were recorded. Breeding success was calculated as the number of fledglings divided by the number of incubating pairs. We investigated the breeding population trend as expressed by the number of incubating pairs, as well as the trend of breeding success. First we explored the presence of trend in the time series, using the Mann-Kendall test, and then estimated the trend magnitude as expressed by Sen's slope and intercept and fitted Theil-Sen models. During 1994 – 2018 the mean number of incubating pairs was 23.96 ± 5.98, varying from 15 in 1996 to 35 in 2014. The overall trend was significantly increasing, while we observed decrease during two periods (1994-1996 and 2001-2004) and in 2012. Breeding success (mean= 61.37±14.16) significantly decreased along time, with the highest values calculated during the first two years (0.95 and 0.88, respectively) and the lowest during the last year (0.35). Concrete conservation actions implemented in the National Park have resulted in breeding population increase. However, the decline in breeding success keeps this increase at a low pace. Breeding failure occurs both during the incubation-to-hatchling and hatchling-to-fledging stage and may be attributed to various factors, including mortality, feeding competition, nest site quality, participation of immature individuals in the breeding pool or stochastic factors, such as weather conditions during incubation.

Abstracts of Talks to be presented during Symposia and Open meetings

Antwerp Zoo Foundation

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Day 3 open meeting during lunch break

The Antwerp Zoo Foundation steps up its role in the Cinereous Vulture international recovery efforts

The Antwerp Zoo Foundation (AZF) is actively involved in reconnecting wild animal populations with a special focus on the cinereous vulture (CV) *Aegypius monachus*, bonobo Pan paniscus, golden- headed lion tamarin, Leonthopithecus chrysomela and okapi Okapia johnstoni. As part of this mission AZF aims to support the international efforts to restore cinereous vulture populations to their historic range in Europe with the objective to re-establish connectivity between isolated core breeding nuclei through reintroductions. While reintroductions are instrumental in founding new colonies, a number of local, national and European organisations are actively involved in in situ conservation work in order to ensure the necessary environmental conditions, organisation and institutional capacity. Close coordination with conservation actors is required to maximize efficiency and ensure success of the recovery efforts. AZF plays a fundamental role in the conservation of the CVs by leading the captive breeding programme (EEP), developing specific knowledge on the species biology, reproduction and genetics. Since captive breeding is an important element of the recovery of the species, AZF is uniquely positioned, with its roots in the Antwerp and Planckendael Zoos, to support conservation efforts with knowledge and technical competences ex situ. AZF intends to step up its efforts and provide direct support to conservation projects not only through reintroduction of captive bred CVs but also through other forms of technical and financial support and in close collaboration and coordination with all players. For this purpose, in concert with the international species action plan, AZF invites the international cinereous vulture conservation community to contribute to the development of the AZF strategy during a dedicated lunch time session on Day 3 of the European Vulture Conservation Conference in 2019.

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Day 2 symposium: Energy infrastructure and vultures

Empowering citizens to reduce raptor mortality due to power lines in the Mediterranean

Violeta Barrios, Catherine Numa, Helena Clavero, José Rafael Garrido López, Justo Martín Martín

Avian electrocutions on powerlines are responsible for population declines of many raptor species in the Mediterranean region and worldwide. In 2016 a major “black spot” of raptor mortality due to electrocution was identified in South-Western Morocco. Since then, the IUCN Centre for Mediterranean Cooperation (IUCN-Med), in collaboration with the Regional Government of Andalusia (Spain), the High Commissioner for Waters and Forests and the Fight against Desertification of Morocco, the Directorate General for Forests of Tunisia and other partners in the region, are developing joint activities to better understand and minimize the impacts of powerlines on raptors. Capacity building and knowledge transfer is a key tool to engage and empower citizens in conservation. The latest Manual for the identification of dangerous powerlines for birds in North Africa, the online course on assessment of powerlines impacts on birds and the mobile application to monitor dangerous powerlines (e-Faunalert) will be presented as tools –freely available and designed to be useful worldwide- to enhance the capacities and knowledge of stakeholders and general public to fully understand and assess the problem, and to ultimately improve spatial planning and retrofitting actions on powerlines to advance in raptor conservation.

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Day 2 symposium: Supplementary feeding strategies in Europe

Not all feeding stations are supplementary: a new nomenclature to inform about the role and function of scavenger feeding stations

Olivier Duriez
Vultures and other scavenging birds play a fundamental sanitary role in terrestrial ecosystems worldwide. However it is one of the most threatened guild of birds, and among the conservation actions, the use of supplementary feeding station is common. However the variety of names used to designate these stations according to their role creates confusion among the public, stakeholders and even conservationists and managers. Here we first review the functions of various feeding actions dedicated to avian scavengers: 1. Conservation of rare species; 2. Management of carcasses; 3. Research purposes; 4. Public viewing and education. Then we propose a new uniform and simplified nomenclature, one that better describes the gradient of function and origin of carcasses: from “Supplementary feeding station for conservation” to “Natural recycling stations for management” (eventually further distinguished between collective and individual recycling stations depending on whether carcasses have been transported or not).

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Success and benefits of the system of individual farms recycling stations for scavenger birds developed in France

Raphael Néouze

In France, the world first reintroduction program for vultures took place in the area of Grand Causses. Alongside this success, at the end of the 20th century, some local livestock breeders expressed the wish to recycle their dead animals on some individual feeding stations. In this momentum, some veterinary studies showed then, the full destruction of the pathogen agents of carrions by the vulture s metabolism. The French regulations integrated these elements in August 1998 and this made possible such an individual system of natural recycling, using scavenger birds. The first Placette d alimentation was settled in 2001 and quickly many more followed. Today a wide network of these devices is spread on a large part of the flyway that covers the reliefs of the South of France. This allows scavenger birds and humans to share common benefits. This presentation is a description of this adventure including technical, practical, legal and strategic elements of the development of this ongoing success.

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Day 2 symposium: Supplementary feeding strategies in Portugal

Symposium on supplementary feeding of vultures in Portugal

This symposium will focus on relevant national and European legislation, management of feeding areas, veterinary/sanitary procedures, conservation objectives/concerns and the future of supplementary feeding of vultures in Portugal.
Building on LPN's experience on creating and managing a network of supplementary feeding stations for vultures in southern Portugal, other experiences and approaches relevant to the Portuguese context will be addressed, including non-fenced feeding areas. The first part of the symposium will include oral presentations from LPN on the above-mentioned work, the Portuguese National Authority for Animal Health on the mandatory rules and procedures for feeding scavenger birds, and the RUPIS LIFE project on its experience on vultures feeding in north-eastern Portugal. In the second part of the symposium, the current challenges as well as the future of supplementary feeding of vultures in Portugal will be widely discussed with the experts and participants of the conference.
This symposium will be of interest to practitioners, researchers and students in-country or from elsewhere that might want to learn more and discuss about the feeding of vultures in Portugal and beyond.