EUROPEAN VULTURE CONFERENCE

Abstracts Book

#Vultures2023

VCF VULTURE CONSERVATION FOUNDATION

LIFE AEGYPIUS RETURN

NATURA 2000

JUNTA DE EXTREMADURA

DIPUTACIÓN DE CÁCERES

Extremadura BIRDING

EUROPEAN VULTURE CONFERENCE

#vultures2023

14,15 & 16 November

EVENT SCHEDULE

Day 1

scientific programme

14 Nov.	Auditorium
08:00	Registration
10:00	Welcome Session
	Junta de Extremadura Vulture Conservation in Extremadura
	MITECO Vulture Conservation in Spain
	José Tavares Vulture Conservation in Europe
11:45	Coffee break
12:15	**Sergio Lambertucci** Old and new threats for Neotropical vultures: what is happening with the Andean Condor and other vultures
	Questions & Discussion
12:55	**Julien Hirschinger & Olivier Duriez** Investigating the 2022 H5N1 Outbreak in French Griffon Vultures
	Jovan Andevski Wildlife Crime Academy
	Questions & Discussion
13:35	Lunch

Programme organization:

All interventions feature one name only:
Oral presentations - the speaker's name
Posters - 1st author's name

Duration of the interventions:
Standard talks - 12 mins
Speed talks - 5 mins

14 Nov.	Auditorium	Sala Europa	Sala García Matos
15:05	**Rafael Mateo** Daily incidence of lead ammunition ingestion in Griffon Vulture in Spain: comparing estimations from regurgitated pellets and blood analysis	**Cloé Pourchier** The conservation of vultures in an interconnected world: focus on West and Central Africa	**Alex Llopis Dell** The Bearded Vulture EEP and its contribution to the advance of knowledge about its biology
	Enrico Bassi Lead ammunition: a widespread threat, hampering the conservation of large avian scavengers in south-central Europe	**Fadzai Matsvimbo** Belief-based use of vultures in Africa: Finding the balance between conservation and culture	**Shannon Hoffman** Bred 4 the Wild – Managing the southern Bearded Vulture for ex-situ breeding success
	Andrea Bonisoli-Alquati Lead and oxidative stress in migrant and resident Turkey Vultures in California	**Sebastián Kohn** Andean Condor research and conservation in Ecuador	**Jemima Parry-Jones** Conservation breeding as a conservation tool for South Asian Gyps Vultures
	Questions & Discussion		
15:55	**Marta Herrero Villar** Monitoring veterinary pharmaceutical residues in livestock carcasses and avian scavengers: new compounds in the spotlight	**MsAP Roundtable** **Mohamed Amezian** Vulture research and conservation in Morocco: Assessment of progress in the framework of the Vulture MsAP	**Alex Llopis Dell** Best practice how to release Bearded Vultures into the wild
	Chris Bowden Update on addressing the ongoing threat to vultures of veterinary drugs	**André Botha** Preliminary report and results of the CMS Vulture MsAP Mid-term Implementation Review	**Marleen Huyghe** Analysis of various release techniques for Cinereous Vultures to determine key factors for an optimal release strategy
	Sophie Cook Are the processes regulating the licensing of veterinary NSAIDs in vulture range states fit-for-purpose?	**Umberto Gallo-Orsi & Iván Ramírez** The Convention on Migratory Species and beyond: Collaborative efforts for vulture conservation	**Emilian Stoynov** Griffon and Cinereous Vultures delayed release of captive bred individuals in reintroduction programmes in Bulgaria
	Questions & Discussion		
16:45	Coffee Break		

14 Nov.

	Auditorium	Sala Europa	Sala García Matos
17:15	**Jorge Rodríguez-Pérez** Sentinel species to inform conservation efforts: an example using Griffon and Bearded Vultures to fight against wildlife poisoning	**Ursula Höfle** Tackling the infectious threat: Vaccination against West Nile Virus in captive Bearded Vultures	**Ilaria Fozzi** Effect of different release strategies on the movements and mortality of restocked Griffon Vultures *(Gyps fulvus)* in Sardinia
	Justo Martín Martín Pair composition and reproductive success as indicators of the impact of poisoning and population health in a Cinereous Vulture *(Aegypius monachus)* population in Southwestern Spain	**Alberto Sánchez-Cano** Highly pathogenic H5N1 Avian Influenza: A new threat to free-living and captive vultures	**Nili Anglister** The effect of extreme weather conditions on the survival of translocated Griffon Vultures in a desert climate in Israel
	Andre Botha Using the African Wildlife Poisoning Database and other measures to reduce the impact of poisoning on African vultures and other wildlife	**B. J. Nadales** Highly Pathogenic Avian Influenza A (H5N1) infection in Bearded Vultures in Spain, 2022	**Ankit Bilash Joshi** Assessing the success of the release of captive White-rumped Vultures in Nepal
	Questions & Discussion		
18:05	**Uroš Pantović** LIFE Balkan Detox project: combating wildlife poisoning across the Balkan peninsula	**Maria Patrícia Couto** The Vulture's Oral Microbiome: Interkingdom synergies as functional adaptations	**Sofía Marrero Rocha** The contribution of AMUS to vulture recovery and conservation
	Melpo Apostolidou Focused anti-poison efforts to curb mortality rates of Griffon Vultures faced with local extinction in Cyprus	**Celine Kalberer** Characterization of „silky" phenotype in the European Bearded Vulture *(Gypaetus barbatus)*	**Davide Montanari** Restoring and connecting Cinereous Vulture *(Aegypius monachus)* colonies to reestablish the former European range of distribution of the species
	Victoria Saravia-Mullin Pilot testing and assessment of methods to reduce human-wildlife conflict as driver of the use of poison in Greece	**Slobodan Davidović** Using genetics for creating proper conservation strategies for protected species – the case of Griffon Vulture *(Gyps fulvus)*	**Stoycho Stoychev** Reintroduction of the Cinereous Vulture in the Bulgarian part of the Eastern Rhodopes
	Zouhair Amaouch Exploring motivations and solutions: understanding poison use in human-wildlife conflicts and conservation management in Morocco	**Philippe Helsen** Vultures translocations: a model to evaluate the impact of genetics in species restoration	**Simeon Marin** Large vultures' reintroductions in Bulgaria, update 2023

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Day 2

EUROPEAN VULTURE CONFERENCE

14,15 & 16 November

EVENT SCHEDULE

scientific programme

15 Nov.

Auditorium

09:00	**Marcos Moleon Pais** Vultures, predators and humans: a story of interactions
	Pascual Lopez Lopez Conservation challenges and opportunities for migratory vultures: a movement ecology perspective
	Questions & Discussion
10:15	**Katherine Steinfield** Carrion converging: Skull shape is predicted by feeding ecology in vultures
	Milene Matos LIFE Aegypius Return: Consolidating the return of the Critically Endangered Cinereous Vulture *(Aegypius monachus)* to Portugal and Western Spain
	Questions & Discussion
	Cultural Moment
11:20	Coffee Break

	Auditorium	Sala Europa	Sala García Matos
11:50	**Corinne Kendall** Using survival analysis from telemetry and transects to assess short-term population trends in vultures	**Olivier Duriez** How hungry are Griffon Vultures ?	**María Jesús Palacios** Threats for carrion birds in Extremadura and their management
	John Mallord High annual survival rates and breeding success aid continued recovery of the Critically Endangered White-rumped Vulture *(Gyps bengalensis)* population in Nepal	**Mattie Purinton** The effects of food predictability on the foraging ecology of African White-backed Vultures *(Gyps africanus)*	**Fiammetta Berlinguer** LIFE Safe for Vultures – implementation of conservation actions and population status

15 Nov.	Auditorium	Sala Europa	Sala García Matos
	Andrea Santangeli Project SURVIVALIST: SURVIVAL in Space and Time: Identifying mortality bottlenecks along the annual cycle of vultures	**David Delgado** Management of food availability as a conservation tool for the Cinereous Vulture population *(Aegypius monachus)* in the Portuguese-Spanish bordering area	**Nikola Novović** Vulture status and perspective in Montenegro - Insights and Challenges
	Questions & Discussion		
12:40	**Eneko Arrondo** Interspecific relationships during Griffon Vulture overwintering in Africa	**Richard Zink** Of vultures and drones: Assessing the potential of Unmanned Aircraft Systems for European vultures research	**Sylvia Zakkak** Wildfire effects on Cinereous Vulture breeding and habitat use in the Dadia-Lefkimi-Soufli Forest National Park
	Chandra David Release Strategies for the California Condor Recovery Program	**Carlota Viada Sauleda** First photographic census of Black Vultures and Griffon Vultures in Mallorca	**Eduardo Santos** Cinereous Vulture *(Aegypius monachus)* recolonization of Herdade da Contenda (Southeastern Portugal): characterisation, evolution and conservation
	Estelle Sandhaus Patterns of parental investment in nesting California Condors	**Yohan Sassi** Vultures' foraging network: a century-old hypothesis investigated with radar	**Pedro Ribeiro** The discovery of a new colony of Cinereous Vultures in Malcata Nature Reserve: population status and prospects
	Questions & Discussion		
13:30	Lunch		
15:00	Poster-Session		

15 Nov.

	Auditorium	Sala Europa	Sala García Matos
	Speed talks		
15:45	**Irene Estellés-Domingo** Wind farms and raptors: unveiling the challenges and solutions for vulture conservation	**Toni Wegscheider** The Bearded Vulture in Germany – results from the first three releases (2021-2023)	**Hristo Peshev** GPS tracking data relates vulture mortality due to acute intoxication at a considerable distance from the site of poisoned bait consumption
	Nicolò Borgianni Monitoring Eurasian Griffon Vulture *(Gyps fulvus)* collision with wind turbines in the central Apennines (Italy)	**Sachin Ranade** The Vulture Reintroduction Program in Assam, India	**Stoycho Stoychev** Antipoisoning activities in Bulgaria to enforce vultures conservation in the country
	Dariusz Gorecki To fly or not to fly in the rotor swep zone? Detection-reaction systems can protect Griffon Vultures against collision on wind farm	**Clément Daboné** Hooded Vultures, *(Necrosyrtes monachus)* are still declining in West Africa: nearly fifty-year assessment study (1969 - 2019)	**Hanna Oosterhoff** Soaring through the central Apennines. Where (not) to go
	Questions & Discussion		
	Speed talks		
16:10	**Apostolis Kaltsis** Current status of Griffon Vulture *(Gyps fulvus)* in Greece: population monitoring results and identification of critical habitats	**Candy Marleen Fahrenholz** Assessing vulture nesting site selection in Namibia: The influence of microscale landscape structures using drone-based methods. Survey of two endangered vulture species at Kuzikus Wildlife Reserve	**Anne K. Scharf** Vulture Research Consortium (VRC)
	Dobromir Dobrev Long-term Griffon Vulture population development in the Eastern Rhodopes, Bulgaria	**Campbell Murn** Heading south, but to where? A shifting distribution of breeding Lappet-faced Vultures *(Torgos tracheliotos)* is impacted by fire and elephants in Kruger National Park, South Africa	**Martina Scacco** The Drylands project

15 Nov.

	Auditorium	Sala Europa	Sala García Matos
	Speed talks		
	Alyona Kaptyonkina Griffon vulture *(Gyps fulvus)* in Kazakhstan	**Sandro López-Ramírez** Is southern Europe environmentally favourable for the long-term establishment of Rüppell's Vulture *(Gyps rueppellii)*?	**Tom Riffel** Tagging vultures in Zambia – movement dynamics in extensive wilderness areas
	Mohammed Shobrak Vulture conservation status in Saudi Arabia	**Michelle Marcano-Delgado** Spatio-temporal movements and home range of Rüppell Vultures in Europe	**Irene Breda** Long distance movements in a social obligate scavenger: exploring the role of age, sex and season
			Alejandro Onrubia Magnitude and trends of vultures passage through the Strait of Gibraltar
	Questions & Discussion		
16:40	Coffee Break		
17:10	**Roundtable 1** The IUCN SSC Vulture Specialist Group (VSG)	**Roundtable 2** Tackling vultures-livestock incidents	**Short Workshop** Positive communication for vulture conservation
	André Botha & Chris Bowden An overview of the IUCN SSC Vulture Specialist Group – 2012-2023	**Fátima Domínguez Gigante** Multi-source data for dealing with conflicts between livestock farmers and vultures: preliminary results from the project LIFE Aegypius Return	
		LIFE GypAct Conflicts between livestock farmers and vultures in France	
18:10	Cultural Visit to Caceres		

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Day 3

EUROPEAN VULTURE CONFERENCE

14,15 & 16 November

EVENT SCHEDULE

scientific programme

16 Nov.

Auditorium

09:00

Darcy Ogada
Drivers of vulture poisoning are not created equal: disproportionate effects and their likely impacts on African and migratory European population

Questions & Discussion

Jose Rafael Garrido López
Conservation Focus: Rüppell's Vulture along the Western Flyway

Keith Bildstein
Future potential advances in vulture conservation

Questions & Discussion

	Auditorium	Sala Europa	Sala García Matos
10:15	**Mary Davies** The SAVE consortium: Saving Asia's Vultures from Extinction	**Cecilia Gimeno Castellano** The natal dispersal of Canarian Egyptian Vultures: extrinsic and intrinsic drivers	**Jon Etxebarria** Factors affecting collision risk in wide-ranging species: implications for large-scale wind energy development
	Mary Malasa The Vulture Safe Zone Initiative - creating safe havens for endangered vultures; successes and lessons learnt in Zambia	**Krishna Prasad Bhusal** Testing of methods to evaluate population numbers of the Egyptian Vulture *(Neophron percnopterus)* in Nepal	**Jacopo Cerri** Fast wind energy development in Sardinia and its overlap with movements of Griffon Vultures *(Gyps fulvus)*
	Radhika Jha Impact of climate change on the habitat suitability of three critically endangered vultures in northern India	**Joan Real** Key factors behind the dynamic stability of the Egyptian Vulture breeding pairs census in continental Spain	**Elena Bravo-Chaparro** Movement ecology to inform environmental planning of renewable energies: an example with Griffon Vultures and wind farms
	Questions & Discussion		

16 Nov.	Auditorium	Sala Europa	Sala García Matos
11:05	Coffee Break		
11:35	**Gideon Vaadia** Accelerometer-based remote classification of Griffon Vulture behavior as a conservation tool	**Jenny Weston** Mid-term Implementation Review of the Flyway Action Plan for the conservation of the Balkan and Central Asian populations of the Egyptian Vulture *(Neophron percnopterus)*	**Constance Blary** Visual perception of wind turbines by birds: focus on vultures and raptors
	Marta Acácio Ageing in nature: lifelong changes in the movement and social behaviour of Griffon Vultures	**Vladimir Dobrev** Egyptian Vulture conservation at a flyway scale: Challenges and opportunities	**Anastasios Bounas** Population Viability Analysis for the Cinereous Vulture in Greece: Extinction Risk assessment under the future impact of windfarms
	Eleanor Flatt Vulture movements and health in a human dominated landscape in South Pacific Costa Rica	**Vladimir Dobrev** Where do Egyptian Vultures from Central Asia spend the winter?	**Elzbieta Kret** When green energy jeopardizes the conservation of threatened species: Cumulative effects of industrial wind farm development on the Cinereous and Griffon Vulture in Thrace, NE Greece.
	Questions & Discussion		
12:30	**JB Mihoub** Long-distance post-release movements challenge the metapopulation restoration of Bearded Vultures	**Vladimir Dobrev** Reinforcement program for Egyptian Vultures leads to successful supplementation of the breeding population in the Balkans	**Alvaro Camina** A review of camera detection systems in Spain to minimize wind energy impacts on vultures and other raptors
	Julien Terraube Identifying the main drivers of young Bearded Vulture movements in three European subpopulations	**Vladimir Dobrev** Recent stabilization of the Egyptian Vulture population in the Balkans	**Alazar Daka** Impact to vultures of wind energy in Ethiopia, an emerging threat
	Dorian Santos-Cottin Back to the Alps: Trends in population size and drivers of breeding success in a reintroduced Bearded Vulture population	**Alessandro Andreotti** LIFE Egyptian Vulture project – main results of actions carried out in Italy	**Agustín Riopérez** DTBird tool for vulture protection and collision control at wind farms

16 Nov.	Auditorium	Sala Europa	Sala García Matos
13:20	Lunch		
14:50	**Pascal Orabi** LIFE GYP'ACT - Strengthening the reintroduction program to restore the *Gypaetus barbatus* metapopulation between the Alps and the Pyrenees	**Antonio-Román Muñoz** From the first observations to the recent establishment: the paradox of a sub-Saharan species colonizing the western Palearctic	**Brian Mcgowan** Global perspective on Insulation and Protection strategy to reduce risk of electrocution on distribution power line infrastructure
	Anthony Andarelli LIFE program GypRescue - Rescue of the Bearded Vultures' population of Corsica	**Alejandro Onrubia** Rüppell's Vulture *(Gyps rueppelli)*: A new vulture species for Europe?	**Liam Innis** RGI's Bird Portal - Working with grid operators and civil society or bird protection around the grid
	Juan Jiménez Reintroduction of Bearded Vulture in the Maestrazgo (E Spain). Are we achieving the expected results?	**Juan Ramírez** First confirmed data of Rüppell´s Vulture breeding in Senegal: phenology and population estimation	**Manon Quetstroey** LIFE SafeLines4Birds. Reducing bird mortality caused by power lines
	Enrique Avila Lopez Bearded Vulture Reintroduction Project in Andalusia: Results and population estimates through the use of camera traps located on cliffs	**Maarten Vis** Breeding Rüppell's Vultures in European zoos	**Rubén Moreno-Opo** Future prospects to reduce negative impacts of power lines
	Questions & Discussion		
16:05	Coffee Break		

	Auditorium
16:35	**Franziska Loercher** An overview on Bearded Vulture conservation in Europe
	Luis T. Costa MAVA and vultures – a personal view on funding vulture conservation and the overall result
	Questions & Discussion
17:05	Closing Session

Meet the Scientific Committee

Patricia Mateo Tomas
Assistant Professor in Ecology and Conservation Biology. Instituto Mixto de Investigacion en Biodiversidad. University of Oviedo, Spain.

Olivier Duriez
Assistant Professor in Ecology and Conservation Biology. University of Montpellier. Centre d'Ecologie Fonctionelle et Evolutive (CEFE-CNRS), France. Advisory board of the Vulture Conservation Foundation.

Alvaro Camia Cardenal
Senior Environmental Specialist. IFC-International Finance Corporation. Advisory board of the Vulture Conservation Foundation.

Raphaël Néouze
Former Vultures Project Manager at the Grands Causses. Psychothérapist. Management board of the Vulture Conservation Foundation.

Fiammetta Berlinguer
Associate Professor in Animal Physiology at the Department of Veterinary Medicine. University of Sassari, Italy.

Enrico Bassi
Research consultant in Wildlife Ecology. Bergamo, Italy. Advisory board of the Vulture Conservation Foundation.

Daniel Hegglin
Researcher at SWILD, Zürich, Switzerland. Management board of the Vulture Conservation Foundation.

Franziska Lörcher
Scientific coordinator at the Vulture Conservation Foundation.

Julien Terraube
Research Officer at the Vulture Conservation Foundation.

Abstracts List

Abstracts: author names underlined will be presenting
at the European Vulture Conference 2023, in Cáceres, Spain

Colour code:

Standard presentation	Poster presentation
Speed presentation	Roundtable

Marta Acácio[1]; Kaija Gahm[2]; Nili Anglister[1]; Gideon Vaadia[1]; Roi Harel[3]; Ran Nathan[4]; Ohad Hatzofe[5]; Noa Pinter-Wollman[2]; Orr Spiegel[1]

1 - Tel Aviv University; 2 - University of California, Los Angeles; 3 - Max Planck Institute of Animal Behavior; 4 - Hebrew University of Jerusalem; 5 - Israeli Nature and Parks Authority

Ageing in nature: lifelong changes in the movement and social behaviour of Griffon Vultures

Movement and social behaviours are key elements of animals' ecology that may change throughout an individual's life. However, most studies oversimplify such behavioural changes to a dichotomy (e.g., comparing juveniles vs. adults), failing to identify non-monotonic changes as individuals age, or the mechanisms through which such age-dependent patterns emerge (e.g., learning or senescence, or differential survival).

Griffon Vultures (*Gyps fulvus*) are a long-lived and social species: they forage in groups, breed in colonies, and congregate in night roosts. In Israel, they are locally endangered and thus the focus of conservation effort. Between 2008 and 2022, we GPS-tracked 319 griffons aged between 0.5 and 20 years old. Using a subset of 135 individuals with sufficient data, we examined how age affected sex- and season-dependent movement probability in three spatio-temporal scales: annual long-distance movements (2000km), and daily medium (20km) and small-scale displacements (1km).

We found a non-linear decline of movement with age in all three scales, revealing three distinct life stages: young age (0-5 years old), with higher probability of movement; adulthood (5-15 years old), with a stabilizing trend in the probability of movement; and old age (> 15 years old), with a pronounced decline in movement. Our results also suggest that individuals change their movement behaviour as they age, indicating a pattern of senescence later in life. Additionally, such lifetime changes in behaviour determine the social interactions between individuals, with potential effects on individual fitness, population dynamics, and ultimately, species conservation.

Keywords: Ageing, Lifelong GPS-tracking, movement, sociality

Zouhair Amaouch[2]; Sidi Imad Cherkaoui[1]; Latifa Sikli[2]; Justo Martín Martín[3]; José Rafael Garrido López[4]; Helena Clavero Sousa[5]; Catherine Numa[5]

1 - Ecole Supérieure de Technologie of Khénifra (Moulay Ismail University). Kénitra, Morocco; 2 - Department of Water and Forests. Government of Morocco.; 3 - WildlifeLab; 4 - Environmental and Water Agency. Ministry of Sustainability, Environment, and Blue Economy. Andalusian Regional Government; 5 - IUCN Centre for Mediterranean Cooperation

Exploring motivations and solutions: understanding poison use in human-wildlife conflicts and conservation management in Morocco

The motivations for the use of poisons are related to human-wildlife conflicts, conflicts between people themselves or linked to the management of protected areas and game reserves.

In recent years, several cases of suspected poisoning deaths of wild animals have been reported throughout Morocco, affecting several species of mammals and birds, including vultures. On this basis, research has been carried out to understand the different factors that would be related to the poisoning of wildlife, to have a general diagnosis of this practice and its extent in Morocco. A series of interviews were conducted to investigate factors that might be associated with the respondent's propensity to use poison, as well as questions related to awareness, knowledge and perceptions about vultures and other wild animals.

The results showed that perceptions and attitudes towards wild animals were mostly negative or neutral, with a few mentions of positive values. Negative attitudes towards certain wildlife species, because of their interference with human activities such as hunting, agriculture or livestock farming, could lead to the use of poison against them, which is illegal in the country.

The lack of awareness of the importance of raptors and vultures among some actors seems to be detrimental to wildlife and could motivate the use of poisons.

ANEF and NGOs would probably benefit from making a genuine and tangible effort to involve these communities in the various stages of conservation management and decision-making. Such participatory processes could bring a new understanding of existing problems, as the successful resolution of wildlife conflicts and conservation in protected areas tends to be more successful when a variety of stakeholders are actively involved.

The national strategy for raptor conservation in Morocco will address this problem, promoting solutions to improve communication between different stakeholders and the perception of wildlife by rural inhabitants.

Keywords: Poisoning, human-wildlife conflicts, Morocco

Mohamed Amezian[1]; El Khamlichi, R.; Rousselon, K.; Radi, M.; Amhaouch, Z.; Bourass, K. & El Hamoumi, R.

1 - GREPOM/BirdLife Morocco

Vulture research and conservation in Morocco: Assessment of progress in the framework of the Vulture MsAP

The presentation will summarize the main research and conservation actions that have been undertaken in favour of vultures in Morocco in the last few years. The focus will be on the actions and projects carried out in the framework of Morocco's efforts to implement the Vulture Multi-species Action Plan (Vulture MsAP) developed by the CMS.

The first of these projects is the establishment of a Supplementary Feeding Station and a Vulture Rehabilitation Centre at Jbel Moussa, in northern Morocco. Both facilities were built by the National Agency for Water and Forests (ANEF) and co-managed with GREPOM/BirdLife Morocco. Our research found that during the northward migration, vultures concentrate in large number under some bad weather conditions. During these "busy" periods, food sources at or near Jbel Moussa cannot sustain these numbers, and the feeding station play an important role in feeding the vultures when most needed. The other purpose of the feeding station is to help "fix" Griffon Vultures at Jbel Moussa in the framework of a reintroduction project which was initiated at the same time.

The third important action is the GPS tracking of Rüppell's Vultures migrating through Morocco between their native sub-Saharan African and the Iberian Peninsula. The number of Rüppell's dispersing northward along with the wintering Griffon Vultures have been increasing, and the objective of this tracking project is to understand more about its movement ecology and detect any potential threats. The project was initiated in 2020 by GREPOM and ANEF in cooperation with the Moroccan Association for the Protection of Raptors (AMPR). The next year, the collaboration became international, with the participation of several Spanish entities.

Authors: Amezian, M.; El Khamlichi, R.; Rousselon, K.; Radi, M.; Amhaouch, Z.; Bourass, K. & El Hamoumi, R.

Keywords: Morocco, vultures, Vulture MsAP, reintroduction

Anthony Andarelli[1]

1 - Natural Park of Corsica

Life program GYPRESCUE - Rescue of the Bearded Vulture population of Corsica

The Bearded Vulture (*Gypaetus barbatus*) is one of four species of vulture found in France. The population of Bearded Vultures in Corsica has suffered a very significant decline since 2009 from 10 pairs in 2009 to only 4 in 2023. The loss of such a species would have serious consequences for Corsica and for the species in general.

There are 3 major threats to the Bearded Vulture population:

- Low genetic variability in a small and geographically isolated population.
- The too low percentage of reproduction due to a decrease in food resources by:
- A reduction in pastoral activity in the mountains
- A decline in the number of Corsican sheep coupled with disturbances caused during the breeding season
- The risk of mortality of this bird very sensitive to lead or toxic poisoning.
- Collision, persecussion or electrocution with infrastructure such as ski resorts or Power grid.

It is in this context that the Syndicat mixte du Parc naturel régional de Corse and its partners have obtained a LIFE+ programme from the European Commission.

Program duration: October 1, 2021 – June 30, 2025.

Associated beneficiaries.

- Vulture Conservation Foundation (VCF)
- Electricity of France – Island Energy Systems (EDF-SEI)
- Departmental Federation of Hunters of South Corsica (FDC2A)
- League for the Protection of Birds (LPO)

The main objective of the "GYPRESCUE" project is to prevent the disappearance of the Bearded Vulture in Corsica by reviving natural reproduction and increasing the island's carrying capacity for the species while avoiding its mortality.

To achieve this objective, important actions are put in place such as strengthening the population, securing the existing population by taking eggs or securing dangerous power lines for example. It is also important to note a strong awareness of the various actors of the Corsican mountains.

Jovan Andevski[1]

1 - Vulture Conservation Foundation

Wildlife Crime Academy

Fighting wildlife crime requires governmental engagement, capacities and multi-sector approach, strengthened through partnerships and collaboration with intergovernmental organizations, CSOs, experts, which are encouraged and lead by national enforcement authorities and combine their efforts to tackle wildlife crime in a comprehensive way.

The Wildlife Crime Academy is set on providing the necessary conditions for improvement of law enforcement efficiency in combating wildlife crime in a sustainable framework, based on the exchange of knowledge and best practice experiences of the environmental and enforcement services from Spain. The courses of the WCA are tailored to cover all the different aspects of wildlife crime (illegal killing, trapping, poisoning, illegal trade), and to suit the different professional profiles of the attendees of the training courses. After completing the three level training courses, the attendees are becoming experts in wildlife crime investigation, fully capable to implement wildlife crime investigation and organize similar training courses in their country.

The Wildlife Crime Academy have been established in 2021 as Vultures Conservation Foundation initiative in close collaboration with the Regional Government of Andalucía and the Spanish ministry for the ecological transition. So far, we have implemented 5 training courses, two level 1, two level 2 courses and one level three course. These training courses have been attended by enforcement agents, veterinarians, and prosecutors (total of 66 representatives) from: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, Egypt, Lebanon, Italy, Morocco, North Macedonia, Spain and Serbia.

Financially support the LIFE Programme of the European Commission (trough: BalkanDetox Life, Egyptian Vulture New Life, Safe for Vultures and Life for Vultures Projects) and MAVA Foundation. For more information please visit: https://balkandetoxlife.eu/wildlife-crime-academy/.

Keywords: wildlife, crime, illegal killing, trapping, poisoning, illegal trade, training, enforcement, law implementation, persecution, capacities

Nili Anglister[1]; Marta Acácio[1]; Eitam Arnon[1]; Gideon Vaadia[1]; Michael Bruer[1]; Ohad Hatzofe[2]; Ygal Miller[2]; Noa Pinter-Wollman[3]; Orr Spiegel[1]

1 - Tel Aviv University, Israel; 2 - Israeli Nature and Parks Authority; 3 - University of California Los Angeles, U.S.A.

The effect of extreme weather conditions on the survival of translocated Griffon Vultures in a desert climate in Israel

Conservation translocations are central tools in the management of endangered species. Yet, implementing these translocations poses logistical and economic challenges, and many programs fail, with most mortality events occurring shortly after release. Therefore, identifying mortality factors and preventing them is crucial. Several factors can affect the survival of translocated individuals, including the condition of the released individual, environmental conditions and the release method.

The Griffon Vulture (*Gyps fulvus*) population in Israel is facing a serious risk of extinction. As part of the recovery efforts, the Israel Nature and Parks Authority translocate individuals from captive breeding or rehabilitated birds from Spain to three release sites: the Carmel Mountain, the Golan Heights, and the Judean Desert. Here we examine risk factors affecting post-release survival focusing on the Griffons released at a desert climate, the Judean desert in Israel. All released individuals were tracked using GPS devices, allowing us to compare the movement distances, behavior, and weather conditions experienced by the translocated with nearby free-roaming individuals.

Our results show that the Judean Desert release site had a significantly lower survival rate compared to other locations. Pathological examinations provided limited information on the cause of death. However, we found that compared to free-roaming vultures, released Griffons were exposed to higher temperatures preceding their death (average of 38ºC vs. 51ºC, respectively), suggesting heat stress. Additionally, the translocated vultures exhibited limited flight capacity initially, with significantly lower probabilities of flying and shorter travel distances per day (2.42 vs. 31.5 km), potentially due to inexperience and undeveloped flight ability.

These findings have led to adjustments in the release protocol, (e.g. winter releases) resulting in significant improvements in the survival of translocated Griffons in the Judean Desert. In conclusion, through accompanying research, the conservation interface can be optimized to ensure the survival of this species in the wild.

Keywords: reintroduction, Gyps fulvus, post release survival, conservation management

Melpo Apostolidou[1]

1 - BirdLife Cyprus

Focused anti-poison efforts to curb mortality rates of Griffon Vultures faced with local extinction in Cyprus

Cases of intentional animal poisonings are widespread in Cyprus, potentially killing hundreds of animals every year, both domestic and wild species. Over the last 25 years (1996–2022), over 50 Griffon Vultures *Gyps fulvus* have been fatally poisoned in Cyprus. After the most recent mass poisoning incident in May 2022, the Cyprus population was reduced to just 9 individuals. Until recently, little was known about the true extent of illegal poison bait use in Cyprus. Dedicated efforts to monitor bait use were established under the framework of the project 'LIFE with Vultures CY' (LIFE18 NAT/CY/001018), a four-year (2019-2023) EU-funded species conservation project.

In 2022, the Game and Fauna Service established the first Anti-poison Dog Units (ApDUs) in Cyprus, to patrol and respond to poisoning reports in the countryside. The collection of data by the ApDUs in 2022 was the first systematic effort to record use of baits in Cyprus, providing information on the extent of bait placement and possible motives behind their use. The ApDUs act as a powerful communication tool and a deterrent factor, as well as making a significant contribution to legal investigation processes.

Through participation of competent authorities in the training course of the Wildlife Crime Academy, run by the Vulture Conservation Foundation and Junta de Andalucía, collaboration of key authorities and elaboration of relevant Protocols, the project has built capacity to tackle this wildlife crime. Efforts were also made to better understand the motives behind poisoned bait use through interviews in villages within the home range of the Griffon Vulture. Specific human-human and human-wildlife conflicts were identified as main drivers for poison bait placement. This information, along with data from the ApDUs, provide a good basis for conservation work, which aims to reduce poison bait use by addressing conflicts and increasing intolerance of illegal bait placement.

Keywords: poisoning, Griffon Vulture, anti-poison dog units

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Reinforcement program for Egyptian Vultures leads to successful supplementation of the breeding population in the Balkans

The Balkan population of the Egyptian Vulture (*Neophron percnopterus*) suffered a sharp decline in the last decades. Nowadays only around 50 pairs survive in Albania, Bulgaria, North Macedonia and Greece. An integrated population model shows that reinforcement of the population with captive-bred individuals would reduce the probability of extinction. The model suggests that a 4% improvement in the survival of the wild individuals combined with the release of 9 birds per year for 20 years, or 6 birds per year for 30 years would lead to a stable population while releases continue. Trial releases of Egyptian Vultures started in Bulgaria in 2016 but the efforts were intensified in the period 2018-2023. Captive-bred Egyptian Vultures were released through three methods – delayed release, fostering and hacking. The aim was to evaluate the success of the methods and to identify the best release technique to be adopted at a larger scale. The survival probabilities of the individuals released through the three methods as well as those of wild juveniles were calculated for the first six months after fledging/release. This period covers the post-release adaptation and the first southward migration. At the end of the 6-month period the survival probability of the wild juveniles (n=17) was 0.59. The captive-bred individuals released through fostering (n=4) had a survival probability of 0.5. The survival of the delayed released individuals was the highest (0.69; n=19), while for those released through hacking survival was the lowest (0.22; n=9). In 2022 two individuals formed pairs with wild partners and occupied breeding territories. In 2023 one more individual occupied a breeding territory with wild partner, which demonstrated that the reinforcement program supplements the breeding population. In total five of the released Egyptian Vultures returned to Bulgaria in 2023 – four released through delayed release and one released through hacking.

Keywords: endangered, Neophron percnopterus, captive-breeding, conservation

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Interspecific relationships during Griffon Vulture overwintering in Africa

Griffon Vulture is the most abundant species of European vultures and has its main stronghold in the Iberian Peninsula. Although it is an eminently sedentary species, during the last decade it has been noticed that an important fraction of the juvenile population of this species migrates to Africa during the first or second year of life. This means the annual arrival of thousands of individuals in a region (Senegal and Gambia) that has four species of local vultures, some of them very similar to the Griffon Vulture. Therefore, it is to be expected competitive and/or mutualistic relationships between griffons and local vultures during the wintering period. However, until now, the interspecific relationships of hibernating griffons with local vulture populations have not been described. In January 2023 we conducted an expedition to Senegal during which, by combining GPS tracking of 27 individuals of 3 Iberian populations of Griffon Vultures and visual surveys, we found that griffons are positively related to the two local Gyps species (*Gyps rueppelli* and *Gyps africanus*) as well as to *Torgos tracheliotos* while *Necrosyrtes monachus* is randomly related. These results represent an important advance in understanding the ecological and evolutionary significance of the surprising juvenile migration of Griffon Vultures.

Keywords: Griffons, migration, Africa, Iberian Peninsula

Enrique Avila Lopez[1]; Borja Nebot[1]

1 - Junta de Andalucia

Bearded Vulture Reintroduction Project in Andalusia: Results and population estimates through the use of camera traps located on cliffs

Bearded Vulture reintroduction project in Andalusia

Status and evolution of the Andalusian population

Quantified results of indirect study methodologies: high-altitude camera traps

Goals achieved and new goals: Where are we and where are we going?

News:

Predation by fox in release cave

Death by poisoning and imputation of the presumed culprit

Bird flu in 2022, no cases in 2023

2 New field markings

Sierra Nevada at all-time highs

Keywords: Status and evolution, Bearded Vulture, Andalusia, high-altitude, camera traps, predation, bird flu, poisoning

Poster presentation

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Wintering habitats of Egyptian Vultures *Neophron percnopterus* and Steppe Eagles *Aquila nipalensis* in India

Egyptian Vultures are globally threatened species and their breeding range stretch from southwestern Europe in the eastern direction up to northwestern India, as well as sub-Saharan Africa. In summer 2022 five individuals of the species were tagged with Aquila dataloggers within the conservation project "Endangered raptor species conservation on the Indo-Palearctic migratory flyway in Kazakhstan". All the five individuals flew southeast for their autumn migration and four birds reached Rajasthan Region in India, where three of the birds remained while one travelled further south to Pakistan. In January 2023, I visited India and the wintering grounds of the three birds, successfully finding all of them, which gave an opportunity to describe the wintering habitats and birds' behaviors. In addition, one Steppe Eagle tagged also with Aquila logger in 2021 in Khakassia Region, Russia within the RRRCN Conservation Project, was wintering in the area.

Keywords: Egyptian Vulture, *Neophron percnopterus*, Steppe Eagle, *Aquila nipalensis*, wintering grounds, Aquila loggers, telemetry

Enrico Bassi[1]; Roberto Facoetti[2]; Maria Ferloni[3]; Alessandro Bianchi[4]; Irene Bertoletti[4]; Giorgio Fedrizzi[4]; Mario Posillico[5]; Stefano Pesaro[6]; Fulvio Genero[7]; Arianna Mocali[6]; Gloria Ramello[8]; Alessandro Mercogliano[9]

1 - Vulture Conservation Foundation; 2 - none; 3 - Provincia di Sondrio Via XXV Aprile; 4 - Istituto Zooprofilattico Sperimentale Lombardia ed Emilia-Romagna; 5 - UTB Carabinieri Castel di Sangro; 6 - Università degli Studi di Udine - Dip. Scienze Agro-alimentari, Ambientali e Animali, Centro ricerca e Coordinamento per il Recupero Fauna Selvatica; 7 - Vulture COnservation Foundation, Riserva Naturale Regionale del Lago di Cornino, Cornino (UD); 8 - University of Copenhagen Natural History Museum of Denmark, Copenhagen (DK); 9 - Gruppo Ornitologico Bergamasco, Museum of Natural Sciences Piazza Cittadella, 10 Bergamo

Lead ammunition: a widespread threat, hampering the conservation of large avian scavengers in south-central Europe

A study undertaken in 2005-2019 analysed 595 tissue samples from 252 raptors (29 Bearded Vultures BV, 112 Griffon Vultures GV, 19 Cinereous Vultures CV, and 92 Golden Eagles GE) collected in IT, FR, CH, AT. Overall, 111 (44.0%) revealed lead concentrations above the background threshold in at least one tissue and 66 (26.2%) were clinically poisoned, even in areas with feeding stations. The highest lead levels were found in the most abundant species with a diet based on soft tissues. In Massif Central-French Prealps, indeed, GV was significantly more exposed (44.3% vs 26.3%) than CV, whereas on the Alps GE was more exposed (52.0% vs 17.2%) than BV. Here, high lead values also occurred in 3 out 7 GE embryos and chicks.

When considering data from Italy alone, 59.5% of 148 carcasses (some of which already considered in the study mentioned above and other ones collected subsequently) had values above the background threshold in at least one tissue and 30.4% was acutely and/or chronically poisoned. Furthermore, the analysis of 34 brains revealed an alarming incidence of lead contamination (9 cases, with values from 0.6 to 2.36 mg/kg wet weight), suggesting that the blood-brain barrier is more permeable to lead than previously assumed.

Lead contamination resulted widespread across Italy, as shown by data referred to GV. In Piedmont, 5 out of 5 carcasses showed chronic/sub-chronic exposure. In Friuli, 1 out of 6 (17.0%) was chronically lead-contaminated. Here, blood analysis from captured individuals (n= 42; Pesaro, unpublished), revealed an incidence of sub-clinical poisoning ranging from 19 to 62%, depending on the threshold used to define the background value. In the Apennines, 10 out of 12 (77.0%) GV and 1 GE were contaminated, with 3 chronic/acute cases.

Given the impact of lead on large scavengers, a transition toward non-toxic ammunition is urgently required.

Keywords: Lead, ammunition, saturnism, hunting, intoxication, mortality, Europe

Poster presentation

Hafeda Benmammar Hasnaoui[1]

1 - Tlemcen Modele forest Association

Status and location of Algerian vulture populations

The preliminary conclusions that we wish to present in this work, are a contribution to the knowledge of the populations of the Algerian vultures (v. Egyptian Vulture, v. fawn, Ruppell's Vulture and Bearded Vulture).

Twelve wilayas (prefecture) were the subject of prospecting visits, knowing on our part that vultures have been reported in these regions in particular. Our objective was therefore to verify the existence of these species and to identify their phenological status, given that Algeria is home to the last natural breeding populations of Griffon Vultures in North Africa, and may also be a territory of wintering for Egyptian Vultures in addition to being a breeder.

We have carried out a series of trips from November 2022 to June 2023 in order to locate the vulture reception sites.

The presence of 3 of the 4 species is confirmed; Griffon Vulture, Egyptian Vulture and Ruppell's vulture.

The statuses could be verified for the 4 species of vultures; the Egyptian Vulture being threatened with extinction in North Africa (IUCN 2020) has a very favorable status in Algeria. As for Ruppell's vulture, it is regularly observed in the western part of the country; rare reports of the Bearded Vulture in the south and north of the country.

Keywords: ultures, Algeria, North Africa; threat

Fiammetta Berlinguer[1]; Jacopo Cerri[1]; Ilaria Fozzi[1]; Davide De Rosa[1]; Antonio Varcasia[1]; Mauro Aresu[2]; Marco Muzzeddu[3]; Dionigi Secci[3]; Giovanni Tesei[4]; Fabrizio Milia[5]; José Tavares[6]; Alfonso Campus[1]

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LIFE Safe for Vultures – implementation of conservation actions and population status

Until early 2000s the population of Griffon Vulture (GV; *Gyps fulvus*) in Sardinia was contracting, due to its small size and low demographic rates. This decline was counteracted by the project LIFE Under Griffon Wings (LIFE14/NAT/IT/000484), which raised the population from 97-110 individuals (33 territorial couples) in 2014 to 316-338 individuals (72 territorial couples) in 2022.

The project LIFE Safe for Vultures aims to i) enlarge the area of occupancy of GVs and increase its carrying capacity by: a) enlarging the farm feeding stations (FFS) network - in North-West Sardinia they provide approx. 9,000 kg of carrion/year, two more were activated in North Sardinia, and further requests are pending for Northern and Central-East Sardinia; b) creating a second nucleus of GVs in south Sardinia to catalyse their expansion - the acclimatization period for first tranche of GVs started in May 2023 together with the provisioning of the centralized feeding stations needed to attract GVs and fix the restocked ones to the area; ii) mitigate poisoning - four more anti-poison units and two more dogs were trained. Overall, 33 preventive inspections and 7 inspections on demand were carried out in 2022: iii) encourage lead-free ammunition in recreational hunting - 37 recreational hunters were recruited for a pilot with lead-free ammunition, with a positive feedback and 60 recreational hunters recruited for the 2023/2024 season; iv) reduce collisions and electrocution with energy infrastructures - 50 poles and 20 km of conductor wires have been secured against bird collision and electrocution. Moreover, the project team evaluated the potential impact of 18 planned wind farms and 230 turbines, by overlapping them with GVs movement from GPS data; and v) increase public awareness - meetings with herders (n=3) and with schools (n=3) were organized in 2022/2023 in South-East Sardinia.

Keywords: scavengers, supplementary feeding, Griffon Vulture, ecosystem services

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Assessing the success of the release of captive White-rumped Vultures in Nepal

Following the catastrophic decline of Gyps vultures in South Asia, the veterinary NSAID diclofenac was banned, and captive breeding populations were established to act as a safety net and ultimately to serve as a source of birds for reintroduction back into the wild once their food supply was diclofenac-free. In Nepal, as a result of conservation efforts, the availability of diclofenac has fallen to virtually zero throughout the whole of Nepal. Therefore, since 2017, 69 birds held in captivity as part of the conservation breeding population have been GPS-tagged and released into the wild. Over the same period, 70 wild birds have been trapped and fitted with GPS transmitters. Here, we report on the process of releasing birds from captivity, detailing both pre- and post-release care and monitoring.

Released birds had significantly lower annual survival rates compared to their wild GPS-tagged counterparts, and undertook much shorter movements, being more reliant on supplementary food provided post-release. Birds died from a variety of causes, including being picked up weak after uncharacteristically long flights, and infestation with roundworms. Consequently, measures were implemented to improve hygiene at the feeding site and introduce rotational feeding, which reduced to zero the number of dead birds found to have been infested with roundworms. However, enlarging the release aviary to try to bolster birds' flight capabilities appears to have had little effect, with birds still being picked up in a weakened state.

We discuss the importance of post-release care in the survival of released birds, and highlight the successes of the release programme with several birds having now entered the breeding population. Finally, although birds died from several causes, none were found to have died from NSAID poisoning, thus confirming the safety of the Vulture Safe Zone.

Keywords: release, protocol, satellite tag, survival

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Patterns of parental investment in nesting California Condors

The California condor (*Gymnogyps californianus*) is a critically endangered monomorphic New World vulture. After a period of extinction in the wild, California condors have recently been reintroduced to a portion of their former range. California condors have low fecundity, rearing one chick approximately every two years with care provided by both parents. Thus, increasing successful nesting outcomes is important to ensuring the continued conservation of this scavenger with an extended life history pattern.

We investigated how reproductive strategies differed between sexes and across nest stages. We observed 35 nests that fledged a chick across 1192 days (2007-20) and collected highly detailed behavioral observations from 9 successful nests (2007-09). We used mixed effects modeling to predict nest attendance duration and frequency, duration of incubation, and food provisioning rates. There was a significant difference in visit frequency among the nest stages ($p<0.001$) and there was a significant interaction between nest stage and sex ($p<0.05$). During the egg stage, females visited the nest more frequently, but during the post-brooding phase, males visited the nest more frequently. Males and females did not differ in incubation duration during daylight hours ($p>0.05$, mean=5.6 hours). We found a significant decline in food provisioning rates over the nestling phase ($p<0.001$). Males and females significantly differed in the frequency of feeding sessions across stage days ($p<0.05$).

We aimed to characterize the behavior of parents throughout the nesting season, as a better understanding of their nesting behavior will help to inform conservation management efforts. Specifically, it will help to identify if nests are deviating from normal ranges of feeding or attendance behaviors and may help us identify if we may need to intervene. Additionally, understanding more about the California condors' reproductive strategies provides us with a stronger comparative perspective to understand how condors compare behaviorally to other vulture species.

Keywords: nesting, social behavior, reintroduction, California condor, parental investment, provisioning, attendance, incubation, sex differences

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1 - Puy du Fou France – Académie de Fauconnerie; 2 - Conservation Education Team

Conservation and education project, the importance of connections

Committed to the field of the conservation of endangered species since its origin, the Puy du Fou has always wanted to develop all of its missions in this direction.

Among them, the missions of conservation education and public awareness hold an important place and have been the subject of many developments over time.

More specifically, the Academie Junior Nature Fauconnerie (a branch of the Academie de Fauconnerie which regularly and permanently hosts a group of young teenage volunteers) has developed an educational project around vultures and their conservation issues.

In this context, the young volunteers can regularly follow the life course of different vultures born at the Puy du Fou and themselves become involved in their conservation.

In addition to the contributions of knowledge related to the species, educational activities presenting the different living environments (ex and in-situ), conservation strategies and the importance of cooperation are proposed.

Also, immersive experience alongside the Academie de Fauconnerie team, such as conservation educational field trips in an in-situ environment (meeting with conservation programs) or active participation in the International Vulture Awareness Day are carried out.

Keywords: Vulture Conservation, Optimist Conservation, Education Conservation / Social Change for Conservation, Learning and Training program, Audience

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Visual perception of wind turbines by birds: focus on vultures and raptors

Birds, particularly vultures, are highly vulnerable to collisions with wind turbines. Various factors seem to play a role in these collisions, such as the location of the wind farms or the type of flight, but there are few explanations for the reasons behind bird collisions. We present here experiments performed on several bird species, to put forward three hypotheses based on our studies on birds' perception of wind turbines to explain collisions. First, birds may have difficulty seeing wind turbines because of low sensitivity to achromatic contrasts. Second, when birds are able to discern wind turbines, they may not detect the rotative movement of blades. Third, even though birds are able to see that the blades are rotating, they may still take the risk of crossing the area swept by the blades. The automatic detection systems currently installed on wind turbines generally trigger a slowdown of the blades at 2-5 rotations per minute (instead of a true stop) when a bird approaches a turbine. In order to reduce collisions, it would be necessary to have a truly fast blade stop. Improving the visibility of wind turbines for birds by painting the blades black and white would also help to reduce collisions.

Keywords: Wind turbine, Collision, Vision, Raptor

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Lead and oxidative stress in migrant and resident Turkey Vultures in California

Migration is energetically costly, often leaving birds in a deficit for fat stores and antioxidants. The Turkey Vulture (*Cathartes aura*) is an obligate scavenger with migrant and resident populations distributed across the Americas. Turkey Vultures are at risk of lead (Pb) toxicosis from ingesting Pb ammunition embedded in offal left behind by hunters. In 2019, California banned Pb ammunition for hunting purposes, yet migratory vultures are likely still exposed to Pb shot outside California. Additionally, oxidative stress from the energetic demands of migration may leave migrating vultures even more susceptible to Pb toxicosis.

To test this, 41 resident and seven migrant Turkey Vultures were captured in southern California between August 2020 and April 2021. Blood samples were tested for Pb concentrations and biomarkers of oxidative stress, including glutathione (GSH), the main intracellular antioxidant, and protein carbonyls (PC), a measure of oxidative damage. Migrants had blood Pb concentrations of 9.37 µg/dL (SD = 2.62), which was higher than among residents (2.41 µg/dL; SD = 1.88). Among residents, PC levels were negatively correlated with GSH concentrations, suggesting an increase in oxidative damage at the depletion of GSH. In migrants no correlation between these biomarkers was found, potentially indicating an upregulation of GSH to face the oxidative cost of migratory flight. Higher Pb concentrations in migrants indicates greater toxicological risk for Turkey Vultures elsewhere within the species' range, especially coupled with the energetic demands of migration. Our results indicate a need for a flyway approach to conservation, as local environmental measures aimed at curbing Pb exposure may inadequately address the conservation needs of migratory birds.

Keywords: Turkey Vulture, lead, migration, oxidative stress

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Monitoring Eurasian Griffon Vulture (*Gyps fulvus*) collision with wind turbines in the central Apennines (Italy)

Avian mortality is one of the most negative impacts of wind farms, and large soaring birds are particularly affected. Two such farms occur within core Griffon Vulture range in central Apennines, and caused some fatalities between 2014 and 2021, though no systematic monitoring has been carried out, but for mandatory impact assessment. Indeed, survival studies suggested that collision with wind turbines is responsible for ca. 20% of mortality in the central Apennines, where a Griffon Vulture population of 300-350 individuals and 70 breeding pairs exists. Thus, we started a program to assess collision episodes and consequently apply effective mitigation measures to reduce mortality risk. As of January 2022, we applied a survey protocol to detect Griffon Vulture casualties in the two wind farms, where three observers scrutinized the area under each wind turbine for any bird remains or carcasses within a 45-m radius from the pylon. From January 25th, 2022, to June 6th, 2023, 56 surveys were carried out at the Collarmele windfarm, inspecting all the 39 wind turbines, a surface of 24,798 ha / sampling event, and 33 surveys were carried out at the Cocullo wind farm, on 37 wind turbines (23,526 ha). At Collarmele, 4 complete carcasses and 4 body parts of Griffon Vultures were found, including 4 marked vultures, and 4 carcasses or remains of other birds, while one GPS-tagged Griffon Vulture was found at Cocullo. Given the increase in the number of fatalities with wind turbines recorded through systematic surveys, we suspect that mortality recorded at wind farms before 2021 has been underestimated. Therefore, to correctly estimate mortality at wind farms and its population impact, we stress the need to continue monitoring activities, combined with GPS-telemetry monitoring. This would allow identifying spatial patterns, and possible seasonality, thus supporting the delineation of the most effective mitigation measures.

Keywords: *Gyps fulvus*, wind farms, collision, mortality, conservation threats, mitigation, monitoring

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Preliminary report and results of the CMS Vulture MsAP Mid-term implementation review

The CMS Multi-species Action Plan for African-Eurasian Vultures (CMS Vulture MsAP) was unanimously adopted by all range states at CMS CoP13 at Manilla in the Philippines in October 2017. The plan proposes 124 conservation action actions focused at addressing and reducing the impact of identified threats that affect Old World vultures over a 12-year implementation timeframe ending in 2029.

2023 signifies the half-way mark of this 12 year timeframe and, in March 2023, the CMS Raptors MoU contracted the Endangered Wildlife Trust, BirdLife International, the Vulture Conservation Foundation and RSPB to conduct a mid-term implementation review to determine the degree of up-take and implementation of the MsAP across all range states and engaging with all relevant stakeholders. A questionnaire that assessed aspects such as the biological- and threat-status and the implementation performance of Range States and stakeholders was distributed to more than 200 contact points and a total of 97 responses were received by the final deadline for feedback.

We will share preliminary results and findings emanating from the analysis of feedback received in the completed questionnaires in preparation of the publication of a final report to be submitted to the CMS CoP15 in Samarkand, Uzbekistan in February 2024.

André Botha[1]; Christopher R. Bowden[2]

1 - Co-chair, IUCN SSC Vulture Specialist Group, Endangered Wildlife Trust, Modderfontein, Johannesburg, South Africa; 2 - Co-chair, IUCN SSC Vulture Specialist Group, Royal Society for the Protection of Birds, Bangaluru, India

An overview of the IUCN SSC Vulture Specialist Group 2012-2023

The Species Survival Commission of the IUCN approved the establishment of a Vulture Specialist Group (VSG), consisting of conservation scientists and other vulture experts in 2012. The aim of the VSG is to advocate and create greater awareness of the plight of Old- and New World vultures and to help to coordinate effective conservation activities to their benefit.

This presentation will focus on the development, growth, structure and achievements of the VSG since its inception and reflect on the support and advantages that VSG membership offers prospective members.

André Botha[1,2]; Darcy Ogada[1,2]

1 - Endangered Wildlife Trust; 2 - The Peregrine Fund

Using the African Wildlife Poisoning Database and other measures to reduce the impact of poisoning on African vultures and other wildlife

Africa's vultures are currently facing a crisis with six of the 10 resident and breeding species on the continent classified as either endangered or critically endangered according to the IUCN Red List of Threatened Species. The most significant threat that drives the decline of vulture populations across the continent is poisoning in various forms that causes large-scale losses exacerbated by the feeding biology and slow reproductive rate of these birds. The Multi-species Action Plan for the Conservation of African-Eurasian Vultures recommends a range of actions that can be implemented by range states to combat wildlife poisoning and to reduce its impact on vulture populations. This includes the establishment and management of relevant databases across the range and focused activities to reduce the impact of poisoning on vultures and other wildlife.

The drivers of these acts of poisoning are often diverse and complex and pose a particular challenge to those involved in the reduction of the prevalence and impact thereof on vultures and other wildlife populations. This presentation will provide insight into the scale, drivers and methods as well as the impact of poisoning on vultures and other wildlife based on data collected in the African Wildlife Poisoning Database. We will also highlight some of the successful measures, such as wildlife poisoning response training and other intervention measures that have been implemented in 15 African countries to reduce its impact in known poisoning hotspots on the continent.

Keywords: Wildlife Poisoning, Database, Vultures, Reducing Impact

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Population Viability Analysis for the Cinereous Vulture in Greece: Extinction Risk assessment under the future impact of windfarms

The development of wind energy is currently one of the main components of the ongoing energy transition. However, it comes with negative impacts on biodiversity and particularly birds, including direct mortality due to collisions with wind turbines. Quantifying the demographic impacts of wind farms on populations of species of interest is of crucial importance to inform management decisions with conservation implications. In this study we build an Integrated Population Model for the Cinereous Vulture (*Aegypius monachus*), combining different sources of data collected during the last three decades in the Dadia-Lefkimi-Soufli Forest National Park, including annual population counts, breeding success and mark-recapture data.

Our main aim was to estimate demographic parameters for the population and use them to examine the likely impacts of wind farm development in the region by assessing its extinction probability for three future scenarios of wind farm development. The results showed that the Cinereous Vulture population dynamics seem to be driven mainly by adult survival, as years when adults experience high mortality negatively impact overall population growth. Without any increase in productivity and assuming stable survival rates, the population's extinction probability by 2040, under the current situation, is estimated at 3.2%. However, if additional wind turbines are established in the area, the population extinction risk increases to 16.4% within 20 years of operation (best case scenario) and can reach up to 98% within four years of operation (worst case scenario).

Our results provide a quantitative warning on how additional mortality can impact the population viability of long-lived species and highlight the need to examine long-term impacts of wind farms at the population level. Any additional windfarm-induced mortality will lead to the destabilisation of the population. Under the extreme scenario of full implementation of the planned wind farm development within the study area, population extinction cannot be avoided.

Keywords: Windfarms, PVA, Mortality, Aegypius monachus, extinction risk, Integrated Population Model

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Update on addressing the ongoing threat to vultures of veterinary drugs

The main cause of the catastrophic declines in Asian Gyps vultures in the 1990s and early 2000s has been conclusively attributed to the veterinary drug diclofenac, which remains in the tissues of carcasses of recently treated cattle, causing visceral gout, kidney failure and death in the vultures feeding on them. The regulation of veterinary formulations in India, Pakistan and Nepal were the first important steps to addressing the issue, and may have prevented total extinction of four species, but legal loopholes appeared, with the drug being illegally sold as a human drug but in veterinary sized vials, convenient for misuse. It also emerged that despite the identification of safe alternatives, other drugs such as aceclofenac, ketoprofen and nimesulide are becoming more widely used, and are also highly toxic to vultures.

The MsAP recognised NSAIDs as the most immediate threat for South Asian vultures in 2017 and conservation efforts in the region have continued to focus on addressing this threat – notably through the SAVE consortium and its Blueprint regional Recovery Plan. Safety testing has been an important element, carried out mainly in India, but also in South Africa. The current status of regulation and plans for further safety testing, and trends in use of these veterinary drugs will be summarised for Asian countries (including some welcome recent updates), with further reference to other continents including Europe. The CMS Raptors MoU recently produced a fact sheet on this topic, highlighting the stated CMS goal for stronger and wider regulation of veterinary diclofenac and other toxic NSAIDs, as well as the need to only license a growing number of NSAIDs that are proven safe for veterinary practice. Progress in regulations has been slow since the initial diclofenac bans in Asia, and risks undoing the progress so far.

Keywords: Veterinary drugs, NSAIDs, Diclofenac, Aceclofenac, Ketoprofen, Nimesulide, Meloxicam, Tolfenamic Acid, Safety testing, Vultures, Drug regulation.

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Movement ecology to inform environmental planning of renewable energies: an example with Griffon Vultures and wind farms

Renewable energies have boosted nowadays in an attempt to achieve carbon neutrality, and comply with international commitments on climate change. However, their implementation is not exempt from controversy, and recurrent calls urge for proper landscape planning that minimizes the negative impacts on biodiversity. Bird collision with wind turbines exemplifies a major detrimental effect of wind energy development on biodiversity. Therefore, understanding the spatial use of birds vulnerable to collision would heavily contribute to reconcile wind energy and biodiversity conservation. To this end we tracked 15 GPS-equipped Griffon Vultures (*Gyps fulvus*), to quantify the intensity of space use at the population level and compare it with wind farm development in the Cantabrian Range (NW Spain). Space use was calculated using Movement-based Kernel Density Estimates (MKDE) with (i) all GPS locations, and (ii) only flights <250m AGL (i.e., maximum height of wind turbines in Asturias).

Our findings revealed that vulture's spatial use surrounding both operational and planned wind farms was higher when considering only low altitude flying locations than when considering all vulture's locations. Moreover, when comparing the wind sensitivity map developed by the Government of Spain with vultures' space use, we saw a weak correlation in planned facilities (meaning that vulture presence was significantly lower around turbines within areas classified as higher environmental sensitivity than around those located in areas of lower sensitivity); contrastingly, the Spanish wind sensitivity map better fitted vulture usage at operational facilities.

Our results highlight the importance of considering the vertical dimension when modeling the space use of flying species; locations at potential risk of collision should be therefore selected for a better assessment of wind energy impacts on biodiversity. Additionally, we also recommend incorporating detailed space use information on those territorial planning tools (e.g., sensitivity maps) aiming at making compatible wind farm development and biodiversity conservation.

Keywords: Environmental impact assessment, GPS-monitoring, Movement-based Kernel Density Estimates (MKDE), movement ecology, sensitivity maps, space use, wind energy

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Long distance movements in a social obligate scavenger: exploring the role of age, sex and season

Long-distance, nonroutine movements (LDMs) have been described in raptors but rarely studied. We assessed the occurrence of LDMs in two interbreeding Griffon Vulture (*Gyps fulvus*) populations in the central-southern Apennines on 64 GPS-tagged birds from 2016 to 2022 (44,746 telemetry days). We defined LDMs as routes exceeding 200km from first recorded location, oriented outwards the study areas. Twenty-seven percent of tagged birds undertook a total of 49 LDMs. The average LDM length was 451km (± 215km), with longest LDM = 1,110km. We investigated the frequency of LDMs across the year to test for seasonality, searching potential relationships between LDMs timing and breeding. LDMs were unevenly distributed throughout the year, peaking in March and June, during incubation and early parental care, when weather conditions start favouring the development of updraughts. We assessed whether sex and age affect the likelihood to undertake LDMs. Once sexually mature, birds which undertook LDMs could potentially breed with members of a different colony, allowing gene flow and increasing genetic variability. We found that frequency of LDMs was independent of sex, but dependent on age: immature birds (<4 years old) were more likely engaged in LDMs, possibly because most of mature individuals are tied to parental duties in spring and summer. Thus, the majority of LDMs does not appear to involve breeding. Most LDMs were oriented northwest or southeast, following the Apennines ridge, in alignment with the distribution of breeding colonies. These findings could reflect prospecting or nomadism, but do not seem to reflect migration.

Keywords: *Gyps fulvus*, Dispersal, Erratism, GPS telemetry, Conservation

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A review of camera detection systems in Spain to minimize wind energy impacts on vultures and other raptors

Several camera-based detection systems have been developed and installed at wind energy facilities with the aim to reduce bird fatalities. The systems allow the turbine to stop spinning blades and thus reducing the risk of mortality. In addition to detection, some of them have also a dissuasion module, which intends to deter the birds while approaching the turbines. Wind farms in Spain have mandatory post-construction fatality monitoring programs lasting between 3-5 years to the entire lifespan of the project. We have reviewed more than 150 wind farm reports between 2020 and 2022. Those having any of the detection systems have only analyzed how the systems do match in their results with the field observers. Overall, there is still a long way to go related with the improvement of bird detection and species specific identification, and not all of them use stereoscopic cameras. The number of false positives is still high, raging 50-80% which may negatively affect turbine operations –more stops than those required- and energy production. Regarding the dissuasion module, there is a lack of scientific evidence it really acts towards birds, with most of the field observations showing no response or behavioral change.

The detection systems should provide solutions from biological but also business perspective.

A consultant should be able of informing about critical periods – seasonal or daily- for each of the species considered, especially for those with an endangered status. For a developer fatigue of turbine components is a major concern. Governments or lenders in the permitting process should base decisions in validated studies, requiring expert and independent contribution. All the above is essential for vultures in emerging regions like Africa, where wind energy tends to optimize the use of field observers.

Keywords: wind energy, camera-base detection, raptors, mitigation

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Comparative analysis of haemoglobin in healthy adult Cinereous Vultures (*Aegypius monachus*): establishing reference intervals in captivity

The analysis of haematological parameters holds significant value in assessing the physiological health of a species, serving as crucial differential tool between healthy and pathologically afflicted individuals. In this study, we examined haematological values in a sample set of 15 clinically healthy, adult Cinereous Vultures (*Aegypius monachus*) aiming to establish normal reference intervals for this population. Animals of this study were captive birds from a dedicated breeding program of a wildlife rehabilitation centre.

A range of haematological parameters were evaluated, including packed cell volume, haematocrit, haemoglobin concentration, total red and white blood cell counts, along with a differential white blood cell count encompassing heterophils, eosinophils, basophils, lymphocytes and monocytes.

Beyond the traditional avian haematological calculation method (calculated haemoglobin), we incorporated haemoglobin measurements from the i-STAT® Alinity V System and the HemoCue® Hb 201+ System for the evaluation their analytical performance in Cinereous Vulture whole blood. Our goal with this comparative study was to elucidate the interrelations between these measurement methodologies.

The ensuing correlation indices were determined with the following results: calculated haemoglobin versus HemoCue® (=0.50), HemoCue® versus i-STAT® Alinity V (=0.86), and calculated haemoglobin versus i-STAT® Alinity V (=0.31). We performed linear regression analyses for these associations and found the strongest correlation between calculated haemoglobin and HemoCue® and between HemoCue® and i-STAT® Alinity V. These findings present a better understanding of the reliability and performance of different haemoglobin measurement techniques in vultures.

Keywords: haematology, haemoglobin, Cinereous Vulture, i-STAT®, HemoCue®, correlation indices

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New population integrated models reveal the factors involved in the exceptional increasing of an Egyptian Vulture population

Vultures are among the most threatened animal taxa in the world, and many species are experiencing dramatic population declines across continents. This is particularly true for the Egyptian Vulture (*Neophron percnopterus*), a globally endangered species that is listed among the most threatened vulture species in the world. In the Iberian Peninsula, home of ca. 90% Europe's carrion bird population, most Egyptian Vulture populations are undergoing worrying declines. However, there is the exception of a rapidly increasing population in the northeast, in Catalonia. The population has been intensively surveyed during the last decade using mark-resighting schemes, GPS tags, breeding population censuses and reproduction surveys. Thanks to this, some initial insights of the population were obtained in previous studies, which showed that large immigration from neighbouring populations was probably a main contributor to such increase. The emergence of Integrated Population Models along with a larger availability of monitoring data now provides the opportunity to generate a more detailed understanding about the dynamics of this population, and to contrast it with the neighbouring declining populations. The results of our models indicate that large adult survival may be behind recent increases in the breeding population. Immigration is probably still an active process in the population contributing to further increases. Mortality mitigation measures undertaken in Catalonia, such as the retrofitting of power lines and the reduction in the number of wildlife poisoning may be behind such large survival prospects.

Keywords: Integrated population models, demography, Egyptian Vulture, Population Viability Analisys

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LIFE Egyptian Vulture project – main results of actions carried out in Italy

In 2018-2022, many actions were undertaken in the framework of the LIFE Egyptian Vulture (EV) project to prevent the extinction of the small population of this vulture breeding on continental Italy, numbering 3-4 nesting pairs.

With the contribution of Carabinieri forestali (CUFAA) and StOrCal, surveillance was assured for more than 627 days to avoid nest robbery, disturbance to the breeding pairs and poaching along the migratory routes. Furthermore, preventive inspections were carried out by CUFAA anti-poison dog units to tackle the use of poison baits in sensitive areas.

E-distribuzione, the main Italian energy company, insulated about 1000 electric line poles in key breeding areas and stopover sites.

Supplementary feeding stations were activated near 5 breeding territories, one more was created in western Sicily to support the EVs during their post-breeding migration.

Thanks to the support provided by CERM Association, 25 captive-born EVs equipped with GPS-GSM devices were released into the wild using the hacking (n = 13) and delayed release (n = 12) methods. Up to March 2023, 4 birds were alive, 13 dead, 3 rescued and brought back to captivity and 5 with unknown fate. Most birds died from human-related causes (illegal killing 5; electrocution 4; poison 1; collision 1), whereas 2 drowned during the crossing of the sea. Hacking was more effective than delayed release in increasing bird survival.

Monitoring activity revealed that the breeding success of the wild pairs is high (1.7; 14 breeding attempts, 24 juveniles fledged). The number of immatures/sub-adults counted in 2022 (at least 9 birds) seems to be sufficient to assure the recruitment of the population in the next future. However, urgent measures are needed to reduce the high human-induced mortality that poses a major obstacle to the population recovery.

Keywords: nest surveillance, supplementary feeding, power line insulation, restocking

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Key factors behind the dynamic stability of the Egyptian Vulture breeding pairs census in continental Spain

Conservation science aims to identify the factors influencing threatened species distribution, enabling the development of effective management strategies. This is particularly key for long-lived species that require long-term monitoring, such as the worldwide endangered Egyptian Vulture (*Neophron percnopterus*). Here, we studied the temporal and spatial variation on the breeding pairs distribution and examined the intrinsic (e.g., breeding site location) and external/anthropic (e.g., windfarms) potential drivers that may be influencing the abundance of breeding territories in Spain.

Using census data of breeding pairs from 2000, 2008, and 2018, we assessed the population temporal stability through Rank Occupancy-Abundance Profiles and we also identify the spatial heterogeneity, i.e., aggregation patterns, through the Local Index of Spatial Autocorrelation analysis. Finally, by the GLM, we identified that the abundance distribution is mainly influenced by the abundance of cattle and Griffon Vultures at the regional scale. Meanwhile, the nonparametric comparisons showed us that the presence of wind farms had a significant negative effect on local breeding pair abundance while vulture restaurants and food resources-related variables had a positive impact. Considering these findings, we recommend a hierarchical approach for future conservation programs, involving actions that promote regional-scale food resource availability and address the negative impact of wind farms at local levels.

Keywords: abundance distribution, Egyptian Vultures, LISA, ROAPs, spatial autocorrelation, trophic resources, vulture restaurants, vulture conservation, wind farm

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Fast wind energy development in Sardinia and its overlap with movements of Griffon Vultures (*Gyps fulvus*)

Wind energy production is booming in the Mediterranean and, its impact on the mortality of large soaring raptors, such as vultures, could be severe.

In this study we focused on the overlap between the movements of 38 Griffon Vultures (*Gyps fulvus*), equipped with GPS/GSM tags, and windfarms in Sardinia (Italy). We used dynamic Brownian Bridge Movement Models to identify areas covered by griffons, identify foraging grounds, flyways and activity rhythms. Moreover, we mapped all operating wind farms and all requests advanced for the construction of new ones.

Griffons restricted most of their movements in two areas located in north-western Sardinia, with significant flyways between them. Activity rhythms indicate that griffons left colonies in the morning, travelling mostly westwards to the foraging grounds and covering distances of 20-30 km, and returned in the afternoon.

Available data included only wind farms (n = 37) and turbines (n = 649) that were built before 2019. Six windfarms occurred in the area covered by Griffon Vultures, and two windfarms were build soon outside the area the most used in the most used area. Only one collision between griffons and turbines was recorded, but the number of collision may be higher due to the lack of systematic monitoring. However, since 2019, several new projects for windfarms were presented to competent authorities, with many turbines envisioned within the occurrence distribution of griffons and along flyways.

Our findings indicate a concerning situation regarding wind energy development in Sardinia. Absent publicly available data, and adequate measures to prevent collisions with griffons, wind farms development is likely to increase mortality. However, the presence of griffons equipped with GPS/GSM sensors, and the predictable temporal distribution of foraging movements, open new possibilities for spatial planning and tailored selective stopping during the most critical moments of the day.

Keywords: behavior, scavengers, wind turbines, dynamic Brownian Bridges Movement Models, forays, home range

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Are the processes regulating the licensing of veterinary NSAIDs in vulture range states fit-for-purpose?

Within a decade (1994-2004), the nephrotoxic effects of the non-steroidal anti-inflammatory drug (NSAID) diclofenac reduced South Asia's once abundant endemic vulture species to one of the most threatened groups of birds in the world. After a suite of bans on the veterinary use of this drug across the Indian Subcontinent in the late-2000s, vulture populations in some areas are thought to be stabilising although numbers remain critically low. Further regulatory progress on banning other NSAIDs also known to be vulture-toxic has been slow and a mosaic of inconsistent licensing decisions exists across the range states of these obligate scavengers. More recently, the marketing authorisation of veterinary diclofenac granted by several EU member states and its rising annual use now poses a threat to the stability of European vulture populations.

My recent master's thesis documented the workings of existing drug licensing procedures for the authorisation and banning of veterinary NSAIDs across key vulture range states in Europe and South Asia. These procedures were then analysed through the lens of various policy legitimacy indicators. While contextual factors limit direct comparisons between certain case studies, all are facing similar challenges that restrict legitimate and evidence-based veterinary NSAID regulation: (i) decisions on NSAID licensing have been made without regards to safety testing in non-target species including vultures, (ii), the limited bindingness of national and international vulture conservation commitments is impeding evidence-based decision-making, (iii), policy variation across the Indian subcontinent has engendered incoherence and ambiguity, while the transparency and enforcement of measures remains a challenge and (iv), the precautionary approach applied to the regulation of other diffuse ecotoxic chemicals in the European Union has not been afforded to the use of veterinary NSAIDs.

Project supervisors: Prof. Rhys Green (SAVE; University of Cambridge), Dr Eva Lieberherr (ETH Zürich).

Keywords: NSAIDs, Policy, South Asia, Europe

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The electrocution case of Bearded Vulture Ortler-BG439 forces us to make progress improving patient management

This work describes the acute trauma from electrocution that occurred in Bearded Vulture Ortler-BG439. The individual was a 19-year-old territorial female nesting in the Swiss Alps and rescued in the neighboring Stelvio National Park, Sondrio Province (Italy). The hospitalization lasted 37 days and it ended with the animal death.

The vulture was picked up in its nesting area on 16th April 2023. It was affected by pathognomonic electrocution lesions with electric marks in the right metacarpal region and in the left tibiotarsus region. A therapeutic process was immediately applied for the treatment of the lesions in collaboration with the Stelvio National Park, the Vulture Conservation Foundation, the Wild Animal Recovery Center of the Sondrio Province, and the Mont Emilius Veterinary Care Home, Charversod, Aosta Province (Italy).

The clinical path of the case has provided elements of evaluation both in terms of therapeutic approach and analysis of intercurrent pathological phenomena. The necroscopic examination in fact showed lesions from *Aspergillus nidulans*.

Ortler's case confirms the incidence of the electrocution problem as a cause of mortality for the species and provides subject for further discussion for the management of hospitalized cases

Keywords: Bearded Vulture, electrocution, *Aspergillus nidulans*, parco nazionale dello stelvio, centro recupero fauna selvatica Sondrio

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MAVA and vultures – a personal view on funding vulture conservation and the overall result

MAVA Foundation was a philanthropic foundation that supported conservation of biodiversity for 28 years, starting in 1993 through the dynamics of its founder Luc Hoffmann. Luc spent his life supporting and developing environmental organisations and was a pioneer of wetland and bird conservation in Europe and West Africa. The Vulture Conservation Foundation was one of his supported organisations, although passing through different formats, encouraged by the need of conserving vultures, but also following the enthusiasm of his friend Michel Terrasse.

MAVA was somehow a different foundation, not only to grant projects but also to build capacity to existing or future organisations in order to bringing resources and sustainability to them, and to promote good governance and capacity to these organisations. The VCF was certainly among the most successful case studies of conservation organisations that could benefit and thrive. I was proudly involved in the evaluation of the former Black Vulture Foundations and the Bearded Vulture Foundation, and could witness the launch of VCF as the reference organisation for the conservation of the 4 species of vultures in Europe, following up on their projects for the last 7 years. Some considerations on the approach for funding VCF and following up on their successful outcomes are presented.

Currently, Nature Returns is a consulting company that is part of the legacy of Luc Hoffmann and MAVA. Our core project aims to bring and incubate businesses to help the management of Protected Areas where management planning and resources are insufficient, by creating win-win situations between those areas and local communities and entrepreneurs. This can potentially be a solution for many sites, including some of the most important ones for vulture conservation.

Keywords: vultures, funding, VCF, conservation impact

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The vulture's oral microbiome: interkingdom synergies as functional adaptations

Vultures' oral microbiome may encode valuable data for assessing environmental stress-related unbalances, host-associated microbiota's diversity changes, and the efficacy of habitat restorations. Allied to vultures' vulnerable condition, the settings at rehabilitation centres may trigger stress-related oral cross-kingdom reorganizations, which can be strategic under these specific settings. This study considers the oral microbiome as data for assessing (1) dysbiosis or environmental/stress-related unbalances, (2) causes and effects of microbial community changes, and (3) whether these changes have functional consequences for the hosts. This project aimed at describing the fungal constituents and the bacterial microbiome of the oral cavity of recovering vultures (n=23) – namely, *Gyps fulvus* and *Aegypius monachus* – sampled at Portuguese wildlife rehabilitation centres.

The study was divided in: 1) characterization of oral yeast-like species present in vulture's host-associated microbiota by performing their morphological and biochemical identification (API20CAUX, *BioMérieux*®) of yeastlike colonies isolated from vultures oral samples, and evaluating their biofilm-forming capacity (Red Congo Agar); 2) evaluation of the contrast between the bacterial microbiome (16S rRNA profiling by 4th NGS®) of animals with and without gross signs of oral yeast-like infections; and 3) evaluation of the potential cross-kingdom interactions present in the oral cavity of the sampled animals.

Candida, as the most abundant fungal species in biofilm-producing co-occurrence networks, fostered an overrepresentation of Clostridium perfringens and/or *Paeniclostridium sordelli*, which may assure the establishment of anoxic oral microenvironment. The detected fungal-bacterial interactions linked strictly anaerobic bacteria growth to polymicrobial complex biofilms, suggesting that synergistic relationships are being established, so vultures assimilate the food provided, due to bacterial degradation of carrion. We hint that the symbiotic network senses environmental signals, adapts its cell arrangements and self-regulates its functions accordingly, as an innate immune system response. An oral dysbiosis may be interpreted as a necessary intermediate stage in a self-regulating oral microbiota.

Keywords: scavengers, yeasts, Clostridium perfringens, microbiome, symbiosis

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Modelling the spatial distribution of the Egyptian Vulture (*Neophron percnopterus*) in Extremadura (SW Spain)

The Egyptian Vulture (*Neophron percnopterus*) is threatened throughout all of its global range, and while in Europe all the rest of vulture species seem to be improving their populations, the Egyptian Vulture is the only one whose populations are declining. While Spain holds up to 40% of the European population, Extremadura is one of the communities of the country with the highest number of breeding pairs, turning the area into an important stronghold for the recovery of the species in Europe. Species distribution models allow understanding the characteristics that determine the realised niche of a species, and therefore, offer important tools for their conservation and management. In the present study, a distribution model for the Egyptian Vulture in Extremadura was developed based on the favourability function. Unlike other type of models, favourability models do not bias the estimated probability of presence of the species caused by unequal observed presence/absence frequencies, and therefore, provides commensurable values regardless of this presence/absence ratio. The favourability of the Egyptian Vulture in the region was determined by abiotic (topography and climatology) and biotic (food availability and vegetation composition and structure) environmental factors. These variables, in addition to identifying areas of high favourability, also help to locate areas where favourability for the species is high, where breeding pairs are present and constitute source areas, as well as areas where favourability is low, but territories are present and which constitute sink areas. This distribution model can be of great help for the conservation of the species in Extremadura, since, as it has been shown previously in other studies, it can be very useful for evaluating the potential impact of the anthropogenic environmental changes on the Egyptian Vulture.

Keywords: *Neophron percnopterus*, Egyptian Vulture, Species Distribution Model, Favourability, Extremadura

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Impact to vultures of wind energy in Ethiopia, an emerging threat

Wind energy in Ethiopia is in its very early stage of development with 664.7 MW operating or under construction. However, potential impacts to African vultures there remain unknown. Here we present some preliminary data at one of the oldest existing wind farms, Adama II, a 153MW 34 turbines in the Oromia region which got commissioned in 2015. There is no post-construction fatality monitoring so impact to birds and bats remains unknown despite the long time since then. From November 2019 to December 2021, we performed carcasses surveys at a selection of ten turbines (29.4% of the wind farm), except between April to September due to the crop growing season and limited visibility in the search plots. The fatality searches was focused to large birds of prey only. Turbine searches were performed using standardized plots with a radius approximately equal to two times the blade length. We found two White-backed *Gyps africanus* and one Rüppell's *Gyps rueppelli*i vultures, remains of bones of another two vultures, and one Yellow-billed Kite Milvus aegyptius. Additionally some additional data from non-systematic searches in March 2019 from other turbines: one Hooded Vulture *Necrosyrtes monachus*, a Large-eared Free-tailed Bat Otomops martiensseni, and remains of a woodpecker Campethera sp. Vulture activity around the wind farm was also recorded with the three species of vultures always present: Rüppell´s 46% of the records, Hooded 23%, and White-backed 30%.

Conclusions of this study require from Ethiopian Government a protocol for fatality searches and mortality estimation of wind farms, training locals for this work and expert wind and wildlife supervision. This is urgently required in a country which remains a stronghold for vulture conservation in Africa where CR species still survive in good numbers.

Keywords: Ethiopia, Endangered, vulture

Chandra David[1]

1 - Condor Propagation, Los Angeles Zoo

Release strategies for the California Condor Recovery Program

The population of California condors dropped to a low of 22 individuals by 1982.

Between 1982-1983, 2 chicks and 16 eggs were brought into zoos to build a captive breeding flock. The progeny would be released to the wild to augment the wild population. Wild condor deaths and disappearances in 1984 forced the team to change plans in a desperate move to save the species.

All birds were captured from the wild to be held for their protection, divided into two groups; one at the Los Angeles Zoo and one at the San Diego Wild Animal Park.

Captive breeding had already begun in earnest and was intended to supplement the declining wild population but it was soon clear that we would need to propagate all condors in captivity until we had a sufficient genetic bank and a new release strategy could be formulated that would work without a wild population in place.

The rearing California condors for release was modeled after successful techniques with the Andean condor of South America. California condors proved to be more behaviorally elastic than their South American relative. North American condors proved to be more easily habituated to disturbance and other hazards like human activity and the first couple release groups were returned to captivity because of unanticipated tameness. The South American released condors had the added benefit of an established wild flock which the hand reared birds could merge into and learn from.

Much more focus had to be spent on the best ways to prepare California condor chicks to produce release candidates that would be less easily habituated and require less field management. Refining hand rearing techniques, the establishment of parent rearing, behavior modification (hazing), and adding adult mentors to the pre-release cohort were experimented with.

Through trial and error, using a lot of different combinations of techniques, we have gradually settled on what works the best.

Keywords: captive breeding, behaviour, reintroduction practice

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Using genetics for creating proper conservation strategies for protected species – the case of Griffon Vulture (*Gyps fulvus*)

Genetic diversity is highlighted by IUCN as one of the three pillars of biodiversity that need to be protected together with species and ecosystem diversity. Thus, before any conservation measures of reintroduction/restocking are undertaken, especially in the regions where autochthonous populations exist, it is necessary to evaluate the genetic diversity of both the autochthonous and introducing populations. If there are no autochthonous populations, the nearest neighbouring populations are used as donors and only if neighbouring populations are non-existent distant populations could be used. In this way, the local adaptations and genetic variation specific to the region will be preserved.

In the Balkan Peninsula, the stable and autochthonous population of Griffon Vulture persists and it should be protected as such. The genetic data based on microsatellites demonstrated the existence of two genetic clusters one of which is specific for the Balkan and Iberian Peninsula. The study of mitochondrial DNA diversity demonstrated the existence of private haplotypes unique for both peninsulas. Long-time monitoring of named populations demonstrated different migration patterns. Birds from the Balkans migrate almost exclusively to the Middle East while the Iberian birds migrate to northwest Africa, which is the reason why they rarely come into contact. Natal philopatric behaviour specific to the species dictates that the unique genetic fingerprint will remain fixed in the region of their origin. Thus, in nature, gene flow between named populations is low, or insignificant. In addition, somewhat different climate conditions between Iberian and Balkan peninsula could also drive genetic differentiation due to the local adaptations.

The detected level of genetic differentiation between these regions suggests that different conservation approaches are needed to preserve specific and unique genetic diversity and that the current program of restocking the vulture population of the Balkan Peninsula with the birds from the Iberian Peninsula needs to be re-evaluated.

Keywords: genetic diversity, *Gyps fulvus*, reintroduction, restocking, Balkan Peninsula, conservation strategy

Mary Davies[1]; Christopher R. Bowden[1]

1 - RSPB

The SAVE consortium: Saving Asia's Vultures from Extinction

There have been few faster, more dramatic and wide scale declines of any species than those of the South Asian resident Gyps vulture populations since the 1990s. Once scientists unravelled the main cause of the declines it was essential that a coherent and science driven response should quickly be put into action across South Asia, based upon well understood priorities and actions that could realistically be implemented. This meant traversing a complex set of political, inter-organizational, vested interests of the pharmaceutical industry as well as veterinary and rural livestock-owners.

An array of NGOs, with some government backing, had taken the crucial first steps to get veterinary diclofenac banned in the four South Asian countries (Bangladesh, India, Nepal, and Pakistan), and viable numbers of founder captive stock into breeding centres. However, there was still the need for a wider, transparent, and recognized framework to coordinate actions among the different actors involved in vulture conservation. With this in mind, the SAVE consortium – Saving Asian Vultures from Extinction – was created. SAVE was launched in February 2011 at high profile events in Delhi and Kathmandu with 14 founding partners, including national and international expertise, and attended by senior politicians.

This presentation will outline the main achievements and challenges of SAVE so far, the partners involved, the structures and ways of working, the focus given by the SAVE Blueprint, and the way progress can continue into the future.

Keywords: conservation strategy, NSAID, South Asia

Poster presentation

Dajana Davitkov[1]; Vladimir Nesic[1]; Sofija Šolaja[1]; Darko Marinković[1]

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Retrospective study of asphyxia as a cause of mortality in population of Eurasian Griffon Vulture (*Gyps fulvus*) in Serbia

Interest in wild raptor mortality has increased recently because many species are in decline and this global problem can cause serious biodiversity problems. The main cause of mortality is human activities that lead to extinction of many bird species, including European Griffon Vulture, whose place in the ecosystem is of great importance. The largest part of the Serbian European Griffon Vulture population is located in the gorge of the Uvac River in Serbia in the special nature reserve "Uvac". The birds nest on the high, steep limestone cliffs above river and its accumulation lakes. In Serbia, the European Griffon Vulture was protected by law in 1994, and since then its population has been increasing. Asphyxia as one of the causes of lethality (mortality) of European Griffon Vultures in Sebia was studied in the period from 2019 to 2022. Twenty nine dead European Griffon Vultures were pathomorphologically examined. Informations on species, sex, and date of carcass collection were collected. Of the total 29 birds, asphyxia was the cause of death in 15 cases. The causes of asphyxia were drowning in the lakes as well as inflammatory diseases such as bronchopneumonia and fibrinonecrotic pneumonia, and infectious lesions (tuberculosis, aspergillosis). Saving Griffon Vultures is of great importance to maintain the function of the entire ecosystem. The impact of these birds on human health is undeniable, making the study of their mortality, identification of potential risks, and elimination of these risks critical to biodiversity conservation.

Keywords: asphyxia, biodiversity, *Gyps fulvus*, necropsy, mortality

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A new breeding area for Egyptian Vultures (*Neophron percnopeturus*) in Western Mediterranean: the first pair in Sardinia (Italy)

For the first time in Sardinia a pair of Egyptian Vultures successfully bred in 2019. We monitored the nest through direct observation by land and by a rubber boat, and the usage of the nearest feeding station through camera traps. We analyzed the effect of the day of the year, the hour of the day, wind direction and wind speed over the probability that Egyptian Vultures were present at a certain hourly timeslot at the feeding station throughout a Bayesian Generalized Additive Model. In the first year Egyptian Vultures had two peaks of frequentation at the feeding station: a first one in June, and a second, more important, between late August and early September. The probability of recording Egyptian Vultures peaked between 10:00 and 16:00,and it was also affected by wind direction, with a slightly higher chance of recording Egyptian Vultures when winds came from South-West, West or even North-West, and lower chance when winds were eastward. In 2019 the chick hatched around the 5th of July, and it fledged around the 21st of September, whereas in 2020 it fledged the 14th of July. In 2021 and 2022 the breeding was unsuccessful.

Keywords: Egyptian Vulture; breeding ; Sardinia ; feeding station

David Delgado[1]

1 - Liga para a Protecção da Natureza (LPN)

Management of food availability as a conservation tool for the Cinereous Vulture population (*Aegypius monachus*) in the Portuguese-Spanish bordering area

The scarcity of food in the Iberian Peninsula has been a significant threat to the Cinereous Vulture population since the implementation of measures to control mad cow disease in the 1990s.

In Portugal, supplementary feeding is allowed under European regulations (Regulations (EC) 1069/2009 and (EU) 142/2011) and the national veterinary authority's (DGAV) Manual of Procedures (Use of Animal By-Products for Feeding Scavenging Birds), as well as recognized as an important conservation tool under the National Action Plan for the Conservation of Scavenger Birds.

The LIFE Aegypius return project (2022-2027) aims to benefit the breeding population of Cinereous Vulture in Portugal and Western-central Spain through various actions, including managing food availability along the Portuguese-Spanish border. We will start by diagnosing trophic resources using existing livestock, game and feeding sites data, as well as estimating the trophic needs of the scavenger community, particularly for the Cinereous Vulture. Once the diagnosis is complete, it will inform the development of a strategy to ensure sustainable access to greater quantities of higher-quality food.

Using the legal and conservation tools mentioned earlier, the creation of at least 65 non-fenced feeding areas will be promoted. Working protocols and best practice guidelines for feeding sites will be aligned to favour the Cinereous Vulture without neglecting the conservation of other priority scavenger birds.

Enhancing food quality involves promoting lead-free hunting, investigating contaminants and pharmaceutical residues, and assessing the health of the Cinereous Vulture.

Simultaneously, the project aims to reduce other population-threatening factors like wildfires, poisoning, and disturbances during the breeding season.

Ultimately, the project's goals include doubling the number of breeding pairs, improving breeding success, and upgrading the conservation status of the Cinereous Vulture in Portugal from Critically Endangered (CR) to Endangered (EN), all of which depend on the improvement of food availability and quality.

Vladimir Dobrev[1,2]; Igor Karyakin[3]; Genriyetta Pulikova[5]; Elvira Nikolenko[3]; Valentin Soldatov[2,6]; Alyona Kaptyonkina[5]; Anna Ten[2,6]; Robert Burnside[2,4]

1 - Bulgarian Society for the Protection of Birds/BirdLife Bulgaria; 2 - Central Asian Vultures Project; 3 - Russian Raptor Research and Conservation Network; 4 - Prince Mohamed bin Salman Royal Reserve; 5 - Biodiversity Research and Conservation Centre, Kazakhstan; 6 - Institute of Zoology, Uzbekistan

Where do Egyptian Vultures from Central Asia spend the winter?

The Egyptian Vulture (*Neophron percnopterus*) is an endangered long-distance migratory species and its populations across Europe, the Middle East and parts of Africa are well studied. In contrast, almost nothing is known for the rest of its range in terms of population numbers, migration, and threats. We tagged 10 juveniles and five immature and sub-adult birds in Kazakhstan and Uzbekistan in 2021 and 2022 to study the migration of the species for the first time in Central Asia and identify its wintering grounds and potential threats along the Flyway. We successfully followed 14 birds in 23 migration trips between 2021 and 2023. All birds (n=14) except for one followed the Central Asian Flyway and wintered in India and Pakistan while one bird spent two consecutive winters in Yemen. The mean migration distance was 2663 km, and birds were able to fly it for an average of 11 days. The migratory speed was higher during the spring than in autumn (294 km/day vs 278 km/day).

The largest obstacle for the birds was the Hindu Kush Mountains and in 18 of the migratory trips, birds used a single corridor, over the valley of the Kabul River to cross the mountain range, flying around 5000 m altitude. Furthermore, to evaluate the number of Egyptian Vultures on the Central Asian Flyway we also counted birds at congregation sites in Uzbekistan, prior to migration, and at one of the wintering sites in Rajasthan. Thus, we counted a minimum of 350 birds in southern Uzbekistan at two dumpsites in 2022 and a minimum of 1000 wintering individuals at Bikaner, India. Survival was high with only one mortality of unknown cause observed in Yemen and another two birds trapped in Pakistan, one by the local authorities and one by locals, both birds were eventually released.

Keywords: Egyptian Vulture, Central Asia, migration, wintering, threats

Dobromir Dobrev[1]; Volen Arkumarev[2]; Vladimir Dobrev[1]; Anton Stamenov[1]; Atanas Delchev[1]

1 - Bulgarian Society for the Protection of Birds; 2 - 1Bulgarian Society for the Protection of Birds

Long-term Griffon Vulture population development in the Eastern Rhodopes, Bulgaria

Griffon Vulture population in the Balkans marked a catastrophic decline during the 1950s–1970s due to mass poisoning events that brought the species to local extinction in many countries. In Bulgaria, the Griffon Vulture population numbered no more than a few pairs at the beginning of 1980s and increased to 130 pairs in 2019. The natal population in the country survived in the Eastern Rhodopes where the first species conservation interventions were applied 30 years ago. The Griffon Vulture population moderately increased (λ =1.05) here from 47 pairs in 2010 to 120 pairs in 2023. In this period the population colonized the majority of the available cliffs in the Eastern Rhodopes and the number of used nests in different years reached over 340. The average breeding success of this sub population remained high during the period and equals to 0.77 chicks per breeding pair. Since 2010 (excluding 2023), 668 chicks have fledged successfully in the Eastern Rhodopes which marked a substantial increase in comparison to 1988-2009 (n = 385). In the period 2010-2022 we marked 54 Griffon Vultures, 36 of which were equipped with GPS transmitters. During the species monitoring we re sighted 357 different marked individuals at the feeding sites in our area. In the study period we have disposed more than 290 tons of food to the vultures in the Bulgarian part of the Eastern Rhodopes at three feeding sites in the area. In total, over 1100 separate feeding events were conducted. The most severe threat to the species remains the use of poisons in the wild and therefore direct and indirect anti-poisoning actions have been undertaken widely and at a large scale.

Keywords: Bulgaria, trend, scavenger

Dobromir Dobrev[1]; Ivaylo Angelov[1]; Anton Stamenov[1]; Atanas Delchev[1]; Stoycho Stoychev[1]; Volen Arkumarev[1]; Vladimir Dobrev[1]; Hristo Hristov[2]; Desislava Kostadinova[2]; Deli Saavedra[3]; Ernesto Alvarez[4]; Davide Montanari[4]

1 - Bulgarian Society for the Protection of Birds; 2 - Rewilding Rhodopes Foundation; 3 - Rewilding Europe; 4 - GREFA

Reintroduction of the Cinereous Vulture in the Bulgarian part of the Eastern Rhodopes

Once widespread and common throughout the Balkans, the Cinereous Vulture population underwent a dramatic decline in the XX th century. In Bulgaria, the last breeding record dates back to 1993 when a single pair raised a chick in the Eastern Rhodopes. Recently, the Cinereous Vulture has been reintroduced in the Balkan Mountains, Bulgaria after almost three decades of absence from the country. However, the last natal breeding colony of the species in the Balkans survives in Dadia-Lefkimi-Soufli Forest National Park in the Eastern Rhodopes, Greece with about 30 pairs. It suffers high mortality due to poisoning and other various threats such as collision with wind farms, electrocution and very low reproductive rates.

To reinforce this natal population and enhance species return in Bulgaria, in 2020 we started preparation and a feasibility study for the reintroduction of the species in the Bulgarian part of the Eastern Rhodopes. In 2021-2022 an adaptation aviary was built near Chernichino, Ivaylovgrad municipality. In May 2022, a total of 17 Cinereous Vultures of Spanish origin were accommodated for adaptation in the aviary. After birds were housed, daily care began, including provision of food, water and daily monitoring of the birds' condition, feeding behavior and dominance hierarchy. Six months later, in November 2022, 14 birds were released into the wild. Following the release of the Cinereous Vultures, birds are being monitored daily through GPS telemetry and cameras installed at the feeding sites in the area. Seven months after the release, four birds died in the wild due to different reasons and one collided with a wind turbine but survived. Furthermore, in 2022, a total of 13 artificial nests in suitable habitats were installed to attract and retain the released birds in the area.

Keywords: Bulgaria, Restocking, release, adaptation

Dobromir Dobrev[1]; Nikolay Terziev[1]; Volen Arkumarev[1]; Anton Stamenov[1]; Vladimir Dobrev[1]; Stoycho Stoychev[1]

1 - Bulgarian Society for the Protection of Birds

Antipoisoning activities in Bulgaria to enforce vultures conservation in the country

The first anti-poisoning dog unit in Bulgaria was founded in 2016. The dog unit operated more than 4 years (October 2016 – December 2020) in the frame of the Conservation of Black and Griffon Vultures in the cross border Rhodope Mountains (LIFE 14 NAT/NL/901) project. During that time 153 searches and patrols were conducted. The majority of the patrols were executed in the Eastern Rhodopes (80%) which is the core area of the vulture populations in Bulgaria. The total number of all findings is 310 with 40 of them being illegally poisoned animals, 7 were animal remains and 10 were poisoned baits. The average number of victims found per poisoning incident is 2.86 ± 3.5. The anti-poisoning dog unit found poisoned 11 animal species. Vultures comprised 17.5% (n=7) of all victims found. In all these cases vultures were unintentional victims. The main cause of poison use were human-predator and human-human conflicts. Wolves and domestic dogs were the most common victims comprising 22.5% and 20% respectively of all poisoned animals found. Carbofuran and Methomyl were identified as the main poison substances used in the investigated cases.

Along with the dog unit operation a development of a National action plan to combat the illegal use of poisons in the wild (hereafter NAP) was initiated with national authorities and NGOs (Ministry of Environment and Waters, Bulgarian Food Safety Agency, Executive Forestry Agency, National Police, Bulgarian Academy of Sciences, other NGOs). In 2021 after intensive communication with the Ministry of Environment and waters the plan was finally endorsed by the Minister.

Local Network of Stakeholders against Wildlife Poisoning in Bulgaria was created in the last two years (2021 - 2022) in Bulgaria. It includes 55 livestock breeders, farmers, hunters, veterinarians and mayors of villages.

Keywords: dog unit, poison, National action plan, law enforcement

Poster presentation

Dobromir Dobrev[1]; Georgi Popgeorgiev[1]

1 - Bulgarian Society for the protection of Birds

Habitat preferences of the Euroasian Griffon Vulture (*Gyps fulvus*) in Bulgaria to support species management

Determining resources available to animals is essential to preserve species and is mandatory to understand their requirements. The relationship between the Griffon Vulture and its habitat requirements at different spatial scales in different areas of the Iberian Peninsula has been well-studied. In the Balkans and in Bulgaria, the distribution of the Griffon Vulture in respect to habitat preferences and selection is largely unexplored because such ecological surveys are limited in the region. Our study aims to identify Griffon Vulture habitat preferences and the specific environmental variables determining its distribution at two spatial scales: landscape and cliff, in the Eastern Rhodopes, Bulgaria. The data set we used for both cliff and landscape preferences of the species was based on long-term breeding distribution surveys conducted during 1987–2018. The study area was divided into a grid comprising 48 cells of the UTM 5 x 5 km grid using the MGRS naming of cells, containing rocky landscapes and cliffs. We found that cliffs occupied by Griffon Vultures were longer ($U = 2.13$, $p = 0.03$) and higher ($U = 1.73$, $p = 0.05$) in comparison to non-occupied ones. The distance to the nearest feeding station was significantly lower in occupied than in non-occupied cliffs ($U = -4.52$, $p < 0.001$). Cliffs occupied by the Griffon Vulture had predominantly southern exposure in contrast to randomly selected cliffs ($\chi 2 = 12.4$, $p = 0.05$). Cells occupied by Griffon Vultures colonies had a significantly more area of rocky habitats than non-occupied ones ($U = 2.78$, $p = 0.003$). Density of human population ($U = 1.19$, $p = 0.25$), the area of open habitats ($U = 1.02$, $p = 0.34$) and livestock densities ($U = 0.39$, $p = 0.73$) did not differ significantly between the occupied and non-occupied cells. Our study may ease Griffon Vulture population conservation management.

Keywords: resources selection, scavenger, spatial distribution

Poster presentation

Dobromir Dobrev[1]; Georgi Popgeorgiev[1]

1 - Bulgarian Society for the protection of Birds

Modeling breeding habitat suitability of Griffon Vultures (*Gyps fulvus*) in Bulgaria and conservation planning

The Eurasian Griffon Vulture is a large raptor considered globally a 'Least concern' species with a vast range. Understanding and investigating the factors that shape Griffon Vulture distribution, fragmentation and occurrence may be of key importance to identify the most relevant conservation actions across its range. We performed habitat suitability modeling to identify species' optimal habitats in Bulgaria, to highlight the Griffon Vulture sites of conservation importance next to its current range and to suggest a general evaluation approach in the management of the species. The study was conducted in Bulgaria. We obtained 83 historical localities of nesting sites and observations of Griffon Vultures in suitable breeding habitats between 1865 and 2019. We also included 269 contemporary breeding localities of the Griffon Vulture presence as input to the ecological niche model. We used 24 variables of four types – bio-climatic, topographic, trophic (continuous) and habitat (categorical). The model was set at 100 repetitions and bootstrap validation for 25% of the data. We then calculated the Spearman Rank Order Correlations and set r=0.7 as a threshold for the resulted data of the preliminary model. The generated model of the Griffon Vulture in Bulgaria resulted in mean AUC of 0.971. The most significant determinant for the Griffon Vulture's distribution was the slope with a contribution of 54.7% to the model. Increasing the slope values over 400 significantly increases the suitability and sites with slope of 500 - 600 are with the highest probability to sustain a Griffon Vulture colony. Habitats of open landscapes type contributed significantly for the final model (17.3%). Territories of high suitability as modeled by our study that comprise past species range, continuous suitable habitat and compose corridors between the different population nuclei must be managed as a matter of priority.

Keywords: scavenger, model, MaxEnt, suitability

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Recent stabilization of the Egyptian Vulture population in the Balkans

The Egyptian Vulture in the Balkans has suffered a significant decrease in the population numbers in the last decades. To halt the decline we implemented the first large scale project on the species between 2011 and 2016. However, it was not sufficient to ensure the survival of migratory species. Hence, to prevent further decline and possible extinction, between 2017 and 2022 we adopted a Flyway approach involving an international alliance of conservation organizations that started a project to save the Egyptian Vultures in the Balkans. Different measures were undertaken in different range states in order to reduce poisoning, persecution and electrocution and thus halt and reverse the population decline along the Eastern Mediterranean Flyway. Whether these conservation measures were successful was monitored by surveying Egyptian Vultures in the breeding grounds in the Balkans.

The Balkan population of the Egyptian Vulture retained one of the highest breeding performances in Europe with an average productivity of 0.91 chicks per occupied territory. The annual survival of adult territorial birds increased by 1%, and the monthly survival of juvenile birds increased by 8%. The population growth rate across the Balkans increased by 6.9% from 0.939 to 1.005 indicating that – for the first time since records began – the Egyptian Vulture population has remained stable for the past five years, numbering 56 occupied territories in 2022. This process is mostly attributed to the core of the population – the Rhodopes, where reoccupation of abandoned and establishment of new breeding territories has started already, facilitated by the increased survival of individuals and the reinforcement program for the species. We recommend the maintenance and expansion of direct conservation measures to reduce poisoning and electrocution, developing Species Action Plans in Albania and North Macedonia and the maintenance of the reinforcement programme to sustain the achieved population stabilization.

Keywords: scavenger, vulture, Balkans, conservation, reoccupation, reinforcement

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1 - CEFE University Montpellier; 2 - Parc National des Cévennes

How hungry are Griffon Vultures?

The definition of carrying capacity for animals limited by their food resources is central in the discussions regarding the conservation or management of increasing populations. For Griffon Vultures *Gyps fulvus*, this question is regularly posed to justify population regulation measures, with the hypothesis that starving vultures have become too numerous and attack livestock. Here we summarize 15 years of research on Griffon Vultures foraging behaviour and energy budget, with the goal to estimate their daily energy expenditure (DEE). First we measured energy expended in flight and on the ground using electrocardiograms on captive freely-flying vultures. Second using biologging data (GPS telemetry and accelerometer), we derived average time budget of wild vultures in two populations in France (Pyrenees and Causses), which we then converted into an energy budget. We found that DEE should average c. 1313 kJ/day. Using allometric equations, this DEE could be converted into mass of meat around 200 g per day. From these data, we modeled the theoretical food requirements of a colony of Griffon Vultures in France (Causses) and compared with food resources officially available every month. However previous studies based on captive vultures estimated food requirements at 400 – 450 g of meat. The discrepancy between our estimate of food requirements from an time-energy budget model and those from captivity require field measurements of daily food intake in wild vultures, in order to re-evaluate models off carrying capacity. We discuss preliminary experiments to record vulture body mass and food collected per day.

Keywords: Gyps fulvus, time-energy budget, carrying capacity, daily energy expenditure, food requirement, foraging

Poster presentation

Rachid El Khamlichi[1]

1 - AMPOVIS

The first recolonisation of the European Griffon Vulture (*Gyps fulvus*) in Morocco

The Griffon Vulture (*Gyps fulvus*) disappeared from Morocco in the 20th century due to its scavenging habits. Individuals became unintentional victims of poisoning for predator control by farmers (Garrido et al. 2014). The species is currently considered to be a long-distance migrant, with migratory numbers exceeding 9,000 individuals in 2018 (El Khamlichi 2020). By 2023, four pairs were established and breeding in the Jbel Moussa protected area in northern Morocco. However, the positive evolution of the Griffon Vulture population in Spain, the proximity of this enclave to the colonies in the Strait of Gibraltar, and the establishment of the first "supplementary feeding station" in this area, as well as the presence of immature vultures throughout the year, have encouraged the recolonisation of the species in northern Morocco

Keywords: recolonisation, European Griffon Vulture, Morocco

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Wind farms and raptors: unveiling the challenges and solutions for vulture conservation

Vultures play a crucial role in maintaining ecosystem health. While wind farms are recognized as a clean and efficient source of renewable energy, their presence can have adverse effects on raptors, including vultures. Here, we aim to provide an overview of the existing scientific literature on the impact of wind farms on raptors' ecology, emphasizing potential strategies to mitigate these negative effects, especially on vultures. Our comprehensive review involved an analysis of 155 studies, revealing a consensus among researchers regarding raptors' avoidance behaviors and the subsequent decline in raptor populations following wind farm installation. However, it is worth noting that over time, some populations may exhibit signs of recovery. The placement of wind farms on mountaintop ridges presents a unique hazard for large soaring raptors, as they heavily rely on topographic updrafts for altitude gain. To gain a deeper understanding of the issue and potential solutions, we propose employing a combination of methodologies, including field monitoring, GPS telemetry, and systematic carcass searches. Some measures to mitigate vulture collisions include on-demand shutdowns and the repowering of wind farms. However, it is important to note that the effectiveness of these solutions remains controversial and context-specific. Furthermore, it is crucial to disclose any potential conflicts of interest, as they can influence the interpretation of research findings. Unfortunately, this practice is not commonly observed in the scientific literature. Finally, it is imperative to evaluate the efficacy of mitigation measures to minimize the adverse impacts of wind farms and promote vulture conservation. This is particularly significant in light of the expanding global renewable energy sector and the growing demand for sustainable energy sources. By prioritizing the conservation of vultures, we can strike a balance between renewable energy development and the preservation of natural ecosystems.

Keywords: renewable energy, collision, mitigation, conservation, telemetry, GPS

Jon Etxebarria[1]; Eneko Arrondo[2]; José Antonio Sánchez-Zapata[3]; José Antonio Donázar[4]; José Antonio Margalida[5]; Martina Carrete[6]; Guillermo Blanco[7]; Francisco Guil[8]; David Serrano[4]; Juan Manuel Pérez-García[3]

1 - Unversidad Miguel Hernández of Elche; 2 - Universidad de Granada; 3 - Universidad Miguel Hernández of Elche; 4 - Doñana Biological Station - Spanish National Research Council; 5 - IREC-CSIC; 6 - University Pablo de Olavide; 7 - Spanish National History Museum-Spanish National Research Council; 8 - Spanish Ministry of Ecological Transition and the Demographic Challenge

Factors affecting collision risk in wide-ranging species: implications for large-scale wind energy development

The ongoing demand for renewable energy to halt global warming has boosted the need to the development of green energy facilities such as wind farms worldwide. Given the impact these facilities have on flying species, a spatially explicit assessment of collision risk in vulnerable species is needed to guide management actions and prioritise areas for the develop of these infrastructures. We used GPS-tracking data of 127 adult and 51 juvenile Griffon Vultures - a species highly prone to collision with wind turbines- in peninsular Spain gathered between 2014 and 2022 to evaluate factors influencing vulnerability and exposure and predict the collision risk. We validate the observed collision risk with actual mortality data and evaluate the impact of current and future turbine facilities. Our results showed that in general vulnerability and exposure was highest in open habitats with predictable carrion availability and lowest near colonies and nesting sites and in areas with unpredictable carrion in both adults and juveniles. Our maps revealed that 40% of the total Spanish surface exhibited high collision risk and that the number of casualties at turbines as positively related to collision risk. Moreover, those areas encompassing large number of turbines are those with higher collision risk. Very worryingly, areas suitable for the siting of new wind farms or turbines overlap to a large extent with areas where collision risk is high. Our work demonstrate that it is imperative to harmonise wind energy development and wildlife conservation, seeking less aggressive alternatives for biodiversity which meets global objectives to reduce carbon emissions.

Keywords: Wind farms, Green energy, Vulture, Conservation, Risk index

Candy Marleen Fahrenholz[1]; Dr. Friedrich Reinhard[2]

1 - University of Muenster; 2 - Wildlife Reserve Kuzikus

Assessing vulture nesting site selection in Namibia: The influence of microscale landscape structures using drone-based methods. Survey of two endangered vulture species at Kuzikus Wildlife Reserve

While vultures were historically revered for their symbolic representation of courage, power, and knowledge, their reputation has become rather gloomy in modern times. However, these scavengers play a key role in our ecosystem by supplying raw materials within the food chain. Unfortunately, vulture populations are declining due to various threats such as poisoning, land use changes, and food scarcity. This study focuses on observing two vulture subspecies, the Lappet-faced Vulture (*Torgos tracheliotos*) and White-backed Vulture (*Gyps africanus*), in the Wildlife Reserve Kuzikus, Namibia, using Unoccupied Aerial Systems (UAS), which have gained popularity as a tool that can support or replace manual surveys, thanks to advancements in technology.A ground-based survey identified 55 trees with potential nesting sites. Subsequently, 34 flights were conducted using the DJI Mavic Pro 2 drone. These flights were carefully executed to avoid any negative impacts such as disturbance, collision, or damage. Notably, the presence of the drone did not significantly deter the vulture adults near their nests.

For the analysis, machine learning techniques, specifically a random forest-based classification, were employed. This approach enabled the calculation of related distances to landscape elements such as water holes or roads, which could potentially influence the choice of nesting tree locations.

The primary objective of this study is to develop effective and feasible conservation measures that ensure the preservation of vulture species. To achieve this, reliable and efficient data recording strategies are essential. By investigating the species distribution, nesting patterns, and the influence of environmental factors on breeding site selection, we aim to gain valuable insights. Additionally, the study results will contribute to identifying additional nest locations within the reserve for future analyses.

Keywords: Scavenger, Remote sensing, UAS, Bird of prey, Southern Africa

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Anticoagulant rodenticides in four species of vultures in Spain and France

The wildlife most affected by the toxic effects of rodenticides anticoagulants (A.R.s) are birds, especially nocturnal raptors. However, the four main species of scavenging birds that inhabit Spain, Griffon Vulture (*Gyps fulvus*), Cinereous Vulture (*Aegypius monachus*), Bearded Vulture (*Gypaetus barbatus*) and Egyptian Vulture (*Neophron percnopterus*), may also be affected. In Europe, the study of the impact of these toxicants on these birds has been carried out in Spain and France from 2005 till now. Out of a total of 652 samples analysed, the presence of A.R.s (sublethal exposure or lethal intoxication) was positive in 175 (26.84%). The most affected are Griffon Vulture (69 positive out of 365 animals analysed (18.9%) and Egyptian Vulture (67 out of 146: 45.89%). The Cinereous Vulture (19 out of 53: 35.84%) and the Bearded Vulture (20 out of 88: 22.72%) are less affected, with a lower number of samples collected too. The compounds detected, in order of highest to lowest incidence, are: brodifacoum (101 cases), bromadiolone (60 cases), difenacoum (47), flocoumafen (29), difethialone (24), A.R.s unspecified (22) and chlorophacinone (6). Diet is the main factor of exposure to A.R.s in these vultures by feeding heavily in the rubbish tips where carcasses of domestic animals and game species are deposited (Spain has a strong hunting tradition) such as wild boar (Sus scrofa), for which control treatments using A.R.s are being tested. Rodents and their remains form part of the usual diet of Bearded Vultures and Egyptian Vultures and their scavenging behaviour makes them an easy target for illegal baiting and A.R.s. kills.

There is a clear lack of studies on the consequences of sublethal intoxications and a more exhaustive analysis and study of the real implications of A.R.s on these vultures, the risk mitigation procedures for their use and the new alternatives for pest control.

Keywords: Vulture, anticoagulant rodenticide, diet, scavenging, intoxication

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Rüppell's Vulture (*Gyps rueppelli*): a new vulture species for Europe?

The Rüpell's Vulture, formerly with a strictly African distribution, has been recently classified as Critically Endangered species worldwide, the last category before global extinction. Nevertheless, during the last decades, observations of the specie in Europe (particularly in the south of Spain) have been in increase. Recently, the environmental administration of the south of Spain (Andalusia) has decided to include it within the species of scavenger birds in the Andalusian Autonomous Community, being the first territorial entity that declares this species as autochthonous outside African continent. The purpose of this study is to carry out a diagnosis of the situation this species of African vulture in the south of Europe through the analyses of all published and unpublished information available on changes in distribution area, possible drivers of these changes, and population trend. Analyses demonstrated that Griffon Vultures in autumn passage by the strait of Gibraltar together with Sahel precipitations anomalies from the previous year are the best predictors of number of observations of Rüppell´s Vulture in Europe, explaining 68.7% of the variance. The proportion of Griffon Vultures in the Sahel has increased markedly as populations of other vultures have declined, and under these circumstances it is more than likely that Rüppell's Vultures were more prone to move to Europe, following Griffon Vultures. This effect has also been favored or magnified by floods in the Sahel due to climate change, which can cause "escapes" or extensive movements of Rüppell's Vultures outside their usual ranges. There is thus an extraordinary circumstance in which a population threatened worldwide, with populations in deep decline in its original range, was "rescued" by natural (assisted?) colonization and potentially establishing of a new population in a different geographic and socioeconomic context.

Keywords: Griffon Vulture, Migration, Sahel, Rüpell's Vulture, Climate Change

Eleanor Flatt[1]

1 - Osa Conservation, University of Edinburgh

Vulture movements and health in a human dominated landscape in South Pacific Costa Rica

King vultures (*Sarcoramphus papa*) are the largest obligate scavengers in central America, meaning they are a key player in the neotropical scavenger network. Yet, they are understudied (with only 23 studies on this species existing), and on the decline. With a mere one study investigating their movement ecology and one study looking at their threats. To ensure effective conservation of this large-bodied scavenger, we need to understand their movements and the threats that affect their animal health and population. Particularly, as in some areas of their geographic range (such as Mexico) populations are thought to be close to extinction. The Osa Peninsula in South Pacific Costa Rica hosts a unique landscape matrix of primary forest, secondary growth forest, palm oil, agriculture, and cattle farms. Osa Conservation, a non-profit working in this landscape, is working to understand the movements, behaviour, animal health and threats of the King Vulture population in the region to guide vulture conservation efforts. We will present results on 44 tagged vultures – five Black Vultures (*Coragyps atratus*), five turkey vultures (*Cathartes aura*) and 34 king vultures (with movement data ranging from 6 - 20 months per individual). We will define their home ranges, daily movements, and flight heights, looking at interspecific and intraspecific differences, and how this varies for male and female birds. We will showcase the health and condition of these individuals, looking at their biometrics, bloodwork and feather analysis (poisoning by lead or mercury - hunting or gold mining). These results are the first of their kind for this species - the King Vulture, and will play a vital role for their conservation in addition to understanding neotropical scavenger networks.

Keywords: Movement ecology, obligate scavengers, traits, home range, flight, carcass, niche, new world vultures, King Vulture

Poster presentation

Eleanor Flatt[1]

1 - Osa Conservation, University of Edinburgh

Scouts vs Usurpers: Alternative foraging strategies facilitate coexistence between Neotropical Cathartid Vultures

Understanding how diverse assemblages of scavengers can coexist on shared ecological resources is a fundamental challenge in community ecology. However, current approaches typically focus on behaviour at carcass provisioning sites, missing how important differences in movement behaviour and foraging strategies can facilitate sympatric species coexistence. Such information is particularly important for vultures - obligate scavengers representing the most endangered avian foraging guild. Their loss from ecosystems can trigger trophic cascades, mesopredator release, and disease outbreaks. We use a combination of morphometric measurements (wing chord, bill length, body mass, tarsi length, and tail length), molecular sexing, and movement data (home ranges, daily movements, and flight height) from wild King (*Sarcoramphus papa*) and Greater Yellow-headed (Cathartes melambrotus) vultures, coupled with carcass visitation data from animal carcass provisioning experiments to characterise scavenger community structure and strategies in the Peruvian Amazon. We find that the movement behaviour of obligate apex scavengers in the western Amazon is linked to their ability to coexist - the Greater -yellow headed vultures, a smaller stature 'scouting' species adapted to fly low and forage early, arrive first, but are ultimately displaced by larger-bodied king vultures at large ephemeral carrion resources.

Keywords: Movement ecology, obligate scavengers, traits, home range, flight, carcass, niche, new world vultures, King Vulture, Greater Yellow Headed Vulture

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Effect of different release strategies on the movements and mortality of restocked Griffon Vultures (*Gyps fulvus*) in Sardinia

In conservation translocation, the intentional movement and release of individuals of a focal species into a certain area, soft and hard-release strategies (with or without acclimatization, respectively) are used. To understand which strategy would encourage a stronger home range stability and higher survival, we compared the spatial behaviour and mortality rates of 38 restocked Griffon Vultures in Sardinia released between 2016 and 2021 after no- (NA), short (SA)- and long-acclimatization (LA) period in an aviary and equipped with GPS/GSM transmitters. Our sample used for data analysis included a total of 699 observations of monthly home range size; all individuals were immature, except for one adult female, and were released at three different sites. Average monthly home ranges were 1,005 ± 1,302 and 818 ± 980 km2 (mean ± SD) for female and male Griffon Vultures, respectively. NA did not stabilize their home range size within the two years after the release, while LA stabilized it in the second year. SA always had a large home range, soon after their release. The number of Griffon Vultures that reached sexual maturity was higher for those released after long acclimatization (71.4%) than for those released after short acclimatization (40%), while only 28.6% of the hard-released individuals reached sexual maturity. Moreover, 57.1% of hard-released griffons were found dead before their fifth year of age. In conclusion, soft release with a long acclimatization period showed to be the most successful method to ensure the stability of home range sizes and the survival of Griffon Vultures, while hard release, however, may be used as a complementary method to inform the general community by releasing animals in the wild at public events.

Keywords: Release strategy, Griffon Vulture, conservation translocation, home range, mortality, acclimatization, Sardinia

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The Convention on Migratory Species and beyond: collaborative efforts for vulture conservation

Vultures are the most threatened group pf raptors and as such a high priority for the Convention on Migratory Species (CMS) Raptors MOU. The Third Meeting of Signatories of the Raptors MOU, which took place in Dubai in July 2023, identified the largest network of sites for the conservation of Raptors in Africa Eurasia, with over 7200 sites, this represents a major breakthrough that should help MOU Signatories to address the management of those sites and ensure their connectivity. The meeting also revised the conservation priorities of all raptors covered by this instrument, and produced an updated action plan with a more focused list of activities each with specific, measurable targets and means of verification.

As Belief-Based Use is emerging as a newly recognized threat for vultures in Africa, particularly in West Africa, the Raptors MOU is finalizing a West Africa Vulture Conservation Plan that will guide 15 Range States to address this complex issue. West Africa hosts most of the Migratory raptors from Western Europe and in their interest conservation actions need to be addressing the main threat – poisoning - and the drives behind it in West Africa.

This presentation will also summarize the current mandate and activities delivered by the CMS avian team, including links to the African-Eurasian Migratory Landbirds Action Plan (AEMLAP), the upcoming study on the use of Wild Meat in Africa and Eurasia and the review of the Programme of Work of the CMS Flyways Working Group. Additionally, links to existing CMS Task Forces, such as the Energy Task Force and the Mediterranean Illegal Killing Task Force will be presented.

Andreia Garcês[1,4]; Roberto Sargo[1]; Diogo Silva[1]; Camila Cardoso[1]; Luis Sousa[1,3]; Filipa Loureiro[1]; Filipe Silva[1,2,3]

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A retrospective study in admission causes and outcomes in three species of vultures in the north of Portugal (2005- 2022)

The vulture population has declined since the 19th century in Europe, with some populations already near extinction. This study aims to investigate the admission causes, and outcomes of vultures admitted to a wildlife rehabilitation centre in Northern Portugal. The data were obtained from the Wildlife Rehabilitation Centre of the University of Trás-os-Montes and Alto Douro (CRAS-UTAD) (Vila Real, Portugal) archives. During a 17 years period (2005-2022), 79 animals were admitted: 10 *Aegypius monachus*, 65 *Gyps fulvus*, and 4 *Neophron percnopterus*. The main causes of admission were unknown cause (57%), transferred from other centres (23%), found debilitated (13%), vehicle collision (6%), captivity (6 %), gunshot (1%), and electrocution (1%). Most animals were admitted during the summer (45.2%) and Autumn (36.9%). Exhaustion, inability to fly and dehydration were the most common signs observed in the animals admitted to CRAS-UTAD. In animals that presented traumatic lesions, fractures of unknown origin were observed, followed by multiple lesions associated with collisions (vehicles, structures). Analysis of outcomes data showed that 73% of the animals that arrived at the centre could be rehabilitated and released back into the wild. Thirteen animals died during treatment. It is the first time that such a study has been carried out for these species in Portugal. Although the data is limited, it can provide precious information concerning these populations, particularly for those endangered.

Keywords: Vultures, Outcomes, Scavenger Birds, Wildlife rehabilitation center

Poster presentation

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1 - Universidad de Murcia

Evaluation of recent exposure to anticoagulant rodenticides in Griffon Vultures (*Gyps fulvus*) sampled in two supplementary feeding stations in southeastern of Spain

Nowadays the use of anticoagulant rodenticides (ARs) is practically the only method used for the effective control of rodent pests in the world.

Usually, liver from dead animals is the sample most frequently used for monitoring RA short and long-term exposures, whilst blood sample maybe really interesting for recent exposure scenarios.

The present study aims to evaluate, through the analysis of 40 blood samples, the degree of recent exposure to 10 ARs (5 FGAR and 5 SGAR) in two populations of Griffon Vultures (*Gyps fulvus*) sampled, respectively, in the vulture feeding stations of Alcoy, Alicante (n=21) and Lorca, Murcia (n=19).

The results indicate that 95% of the vultures sampled had measurable levels of AR in blood. Thirty-five percent of the samples were positive to FGAR, while in the SGAR the prevalence was 92.5%.

The relative high frequency of detection of FGAR was due to the presence of diphacinone in almost 60% of the samples from Lorca (Murcia) in contrast with less of 5 % in Alcoy. Recently, many irrigated agricultural lands in the Region of Murcia are being invaded by rabbit pests, which could have been the origin of an illegal use of diphacinone, compound that is not authorized for use by the EU. This is just a hypothesis that must be confirmed in the future with relevant studies and research on the ground.

On the other hand, in general, the high incidence of SGAR, especially difenacoum (92.5%) and brodifacoum (80%), indicate that these animals have been exposed to an amount of rodenticides above what is expected in a recent period.

In any case, it is evident that the Griffon Vulture, as a scavenger species, is exposed to rodenticides (some of them unauthorized), so we must assume that other scavenger species, as well as predatory species, must be suffering a similar exposure.

Keywords: poisoning, supplementary feeding, illegal use

Jose Rafael Garrido López[1]; Rachid El Khamlichi[2]; Zouhair Amhaouch[3]; Karim Rousselon4; Justo Martín[5]; Juan Jose Iglesias-Lebrija[6]; Ernesto Álvarez[6]; Virginia Moraleda[6]; Miguel Ferrer[7]; Carlos Florencio[7]; Vincet Lieron[11]; Iñigo Fajardo[8]; Jose Ramón Benítez[1]; Jesus Bautista[9]; Helena Clavero[10]; Catherine Numa[10]

1 - Environment and Water Agency, Regional Government of Andalusia, Spain; 2 - AMPOVIS and CRV Jbel Moussa, Morocco; 3 - National Water and Forestry Agency of Morocco, Head of the Parks and Natural Reserves Division, Morocco; 4 - Moroccan Association for Raptor Conservation; 5 - Environmental consultant, Spain; 6 - GREFA (Group for the Rehabilitation of Wildlife and their Habitat), Spain; 7 - Applied Ecology Group, Estacion Biológica de Doñana, CSIC, Spain; 8 - Head of Wildlife Conservation Department of Andalucia, Regional Government of Andalusia, Spain; 9 - Wilder South (Society for the Study, Observation and Conservation of Mediterranean Biodiversity), Spain; 10 - International Union for Conservation of Nature - Centre for Mediterranean Cooperation (IUCN-Med), Spain; 11 - Emirates Center for Wildlife Propagation

Conservation focus: Rüppell's Vulture along the Western Flyway

The Rüppell's Vulture (*Gyps rueppelli*) is listed as 'Critically Endangered' at the global level in the IUCN Red List of Threatened Species and the Red Lists of breeding raptors of North Africa and Mediterranean region. Over the last 4 years, 27 individuals have been marked with GPS transmitters in northern Morocco during their movements from their areas of origin in the Sahel to Europe and vice versa following the Griffon Vulture (*Gyps fulvus*) migration. The analysis of the movements of these vultures indicates that there are 3 main areas of temporary settlement of the species along the western flyway: one in the northern half of Morocco and another on the west coast of central Morocco, where the birds find food from midden, carrion and rubbish dumps; and another in a desert area of northern Mauritania, where there seems to be an important area of food concentration due to the existence of a high density of goat farming. In addition, the importance of southern and western Spain for birds crossing the Strait of Gibraltar to the north has been noted, in the main feeding and breeding areas of Griffon Vultures. In addition, the importance of southern and western Spain for birds crossing the Strait of Gibraltar to the north has been noted in the main feeding and breeding areas of Griffon Vultures. This is important because very few of the birds that cross into Europe can re-cross the Strait of Gibraltar to Africa. Main feeding and breeding areas have also been located in the Sahel, mainly in Senegal and Gambia, but also in Guinea Conakry. We believe that these are the main areas where conservation efforts for the species along the western flyway should be focused.

Keywords: Rüppel Vulture *Gyps rueppelli*, Movements, Mediterranean region, Sahel, Conservation

Poster presentation

Jose Rafael Garrido López[1]; Matías De Las Heras Carmona[1]; Jose Ramon Benitez[1]

1 - Environment and Water Agency, Regional Government of Andalusia, Spain

Winter census reveals increasing Griffon Vulture population in South of Spain

In January 2022, the IVth Winter Census of Griffon Vultures (*Gyps fulvus*) was conducted in Andalusia, Southern Spain. The census was coordinated by the Consejería de Medio Ambiente, the environmental department of the Regional Government. A total of 17,880 vultures were counted, with an equal distribution between the Sierra Morena in the north and the Sierras Beticas in the south. These numbers represent a 20% increase compared to the estimated wintering population a decade ago. Approximately half of the wintering vultures were non-adults, and as observed in previous winters, most of the young vultures were concentrated in the Sierra Morena. Their movement patterns in this area depend on the availability of carrion from livestock and hunting. Additionally, Andalusia serves as a wintering ground for around 7,000 non-adult vultures from other regions of Spain and Europe, accounting for over 38% of the resident population. This has been confirmed through the identification of vultures' rings and wing tags, indicating their origins from various countries such as Spain, Portugal, France, and even Bulgaria. Considering that Andalusia also serves as a refuge and feeding area for nearly 9,000 vultures that migrate to Africa each year, it plays a crucial role in the conservation of breeding populations. The increase in the wintering population aligns with the upward trend of the breeding population, not only in Andalusia but also throughout Spain. Consequently, deaths resulting from poisoning and collisions with wind turbines, the main sources of non-natural mortality, only have a localized impact. The Junta de Andalucia's efforts to combat poisoned baits have been instrumental in minimizing the significance of poisoning incidents. Overall, these findings confirm that Andalusia and its environmental administration are essential for the conservation of Griffon Vultures at a continental level.

Keywords: Griffon Vulture Gyps vulture, Wintering, Spain, conservation

Jose Rafael Garrido López[1];Victor Fiscal[1]; Justo Martin Martín[2]

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Reducing Griffon Vulture electrocution mortality in Andalusia, South of Spain

The Consejería de Medio Ambiente, the environmental department of the Andalusian Regional Government has been implementing measures since the late 20th century to adapt power lines to regional and national regulations, making them safe for birds. As a result, the Andalusian Regional Government has established a database to record all incidents of bird mortality on power lines, enabling the necessary adaptations to be made to ensure the safety of avian species. We present the analysis results of this database regarding the incidence of mortality due to electrocution in the population of Griffon Vultures *Gyps fulvus* in Andalusia. Since 1990, a total of 320 cases of Griffon Vulture electrocutions have been detected throughout the region, primarily concentrated in feeding areas and wintering sites. Over one-third of these electrocutions occur during post-breeding migration and winter, affecting both local vultures and those originating from other regions of Spain and Europe. Although the documented mortality due to electrocution has increased in the last two decades, attributed to the growth of the breeding population and improved detection efforts, it does not exceed 5% of the overall mortality for the species in Andalusia, thus not being a limiting factor for the population. Over the past four years, the mortality rate has stabilized due to intensified efforts to retrofit the most hazardous power lines, driven by the regional government. Nearly 7,000 support structures have been adapted, resulting in a significant reduction in mortality. These actions demonstrate the commitment of the regional government to conservation and have contributed to the overall stability of the Griffon Vulture population. The achievements in reducing the mortality of the Griffon Vulture due to electrocution are the result of a coordinated approach involving data collection, analysis, and proactive adaptation of power infrastructure. In collaboration with power distribution companies.

Keywords: Griffon Vulture, *Gyps vulture*, Power lines, electrocution, South of Spain, conservation

Cecilia Gimeno Castellano[1]; José Antonio Donázar[1]; David Serrano[1]

1 - Doñana Biological Station - CSIC

The natal dispersal of Canarian Egyptian Vulture: extrinsic and intrinsic drivers.

Natal dispersal plays a crucial role in the lives and fitness of animals, as it involves individuals leaving their natal patch and venturing out in search of a suitable breeding location. At a higher level, the movement of individuals and genes across space shapes the structure and dynamics of populations, influencing processes such as colonization, local adaptation and speciation.

Despite the ecological and evolutionary implications of natal dispersal, only a limited number of studies have explored how biotic and abiotic factors influence this process in long-lived vertebrates, due to the methodological constraints associated to data acquisition in large, open study systems, where detailed and continuous field monitoring over extended periods of time is required. Birds have long been regarded as a classic model for dispersal studies. However, research focusing on long-lived territorial species is scarce. Here we have examined the natal dispersal of the Canarian Egyptian Vulture (*Neophron percnopterus* majorensis), an endemic subspecies exhibiting an extended pre-breeder stage and non-migratory behaviour.

The monitoring of this population started in 1998. Annually, the identity of breeding adults was determined for each territory and all the fledglings were ringed. Currently, 91% of the population is individually identified with plastic rings. For this study we have recorded 210 cases of birds marked as fledglings and recruiting into the breeding population. On this basis, our main aim is to understand the interplay between individual traits, social context, and abiotic variables to unravel their effect on variables as age of recruitment and dispersal distance. Our preliminary findings have shown differences in dispersal strategies between sexes, where males tend to recruit closer to their natal patch and later than females. The results of this study will help us to understand the dispersal processes on islands and will be used to improve conservation actions.

Keywords: Natal dispersal, Egyptian Vulture, Long-term monitoring, Long-lived territorial vulture, Canary islands

Juan Antonio Gil[1]; Gonzalo Chéliz[1]; Oscar Díez[1]; Juan Carlos Ascaso[1]; Juan Manuel Blanco[2]

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Vitamin and mineral supplementation to improve the reproduction of Bearded Vultures (*Gypaetus barbatus*) in the Central Pyrenees (Aragon)

There are several essential nutrients for the proper functioning of organisms, which cannot be synthesized naturally, but through food. At present, the diet of many species has been modified, the nutrient composition of what they ingest altered, or the presence of certain environmental toxins or other compounds alter both the absorption and the metabolism of certain essential micronutrients for the performance of the biological functions, including reproduction, growth or the development and functioning of the immune system. In the case of the Bearded Vulture (*Gypaetus barbatus*), the existence of a poorly varied diet, or the presence of certain environmental toxins, can cause a decrease in vitamins and minerals, which affect reproduction, whether in eggs or chickens. Between 2020 and 2023, a supplementary feeding program was carried out in 10 reproductive units (UR) of Bearded Vultures in the Central Pyrenees (Aragon) and for which 2800 kg were contributed. of bones in which a mineral vitamin supplement was applied. During these four years, samples of 39 eggs and one chicken were collected, which come from rescues carried out in 19 Bearded Vulture UR. Of these, supplementary feeding is done in five UR and 24 eggs of 14 rescued UR and 14 chickens born from the rescue of nine UR are analyzed. It is determined to what extent the supplemented UR have incorporated the supplements into their organism and to what extent it may have significant effects on the survival of the chickens. The results show a correct intake, tolerance and assimilation of the supplements used, translating into higher levels of vitamins A, E, carotenes, calcium, weight and size of eggs and hatchlings, conversion rates, immunomodulation, stress tolerance and ultrastructural quality of the shell. The improvement in these parameters has been related in other species, with a higher rate of hatching and survival.

Poster presentation

Guillermo Gómez-López[1]; Ana Sanz-Aguilar[2]; Martina Carrete[3]; Guillermo Blanco[1]

1 - National Museum of Natural Sciences (MNCN-CSIC); 2 - Institut Mediterrani d'Estudis Avançats (IMEDEA-UIB-CSIC); 3 - Pablo de Olavide University

Insularity determines nestling sex ratio variation in Egyptian Vulture populations

Variation in offspring sex ratio, particularly in birds, has been frequently studied over the last century, although seldom using long-term monitoring data. In raptors, the cost of raising males and females is not equal, and several variables have been found to have significant effects on sex ratio, including food availability, parental age and hatching order. Sex ratio differences between island populations and their mainland counterparts have been poorly documented, despite broad scientific literature on the island syndrome reporting substantial differences in population demography and ecology. Here, we assessed individual and environmental factors potentially affecting the secondary sex ratio of the long-lived Egyptian Vulture *Neophron percnopterus*. We used data collected from Spanish mainland and island populations over a ca. 30-year period (1995–2021) to assess the effects of insularity, parental age, breeding phenology, brood size, hatching order, type of breeding unit (pairs vs. trios), and spatial and temporal variability on offspring sex ratio. No sex bias was found at the population level, but two opposite trends were observed between mainland and island populations consistent with the island syndrome. Offspring sex ratio was non-significantly female-biased in mainland Spain but significantly male-biased in the Canary Islands, where a male-biased mortality among immatures could be compensating for offspring biases and maintaining a paired adult sex ratio. Temporal and spatial variation in food availability might also have some influence on sex ratio, although the difficulties in quantifying them preclude us from determining the magnitude of such influence. This study shows that insularity influences the offspring sex ratio of the Egyptian Vulture through several processes that can affect island and mainland populations differentially. Our research contributes to improving our understanding of sex allocation theory by investigating whether sex ratio deviations from parity are possible as a response to changing environments comprised by multiple and complexly interrelated factors.

Keywords: demography, islands, Neophron percnopterus, nestling sex, offspring sex ratio, sex sequence

Álvaro Guerrero Mayo[1]; Sofía Marrero Rocha[1]

1 - AMUS (Acción por el Mundo Salvaje)

The contribution of AMUS to vulture recovery and conservation

Extremadura is perceived as an optimal territory for scavenger birds.

From AMUS we will provide a quick overview of our main successes in the last three decades in the recovery and maintenance of these species, both with our conservation actions on the ground and our own wildlife hospital.

We want to make ourselves known, to show our most interesting contributions, and to exchange them with entities prone to multidisciplinary team work:

Network of targeted feeding stations, tagging campaigns and biomedical controls, recovery of hundreds of individuals, custody of public lands, collaboration with livestock holdings, habitat improvement as well as a huge effort in trauma medicine and the sanitary management of hundreds of individuals in captivity for reintroduction projects.

We have focused all our efforts to know in depth all the problems and reduce them. In this process we have undergone experiences that made us make many mistakes, and some successes. We want to share some:

In Extremadura we have proved the success of the implementation of a model of partnership and co-participation with the Public Administration. It is an example in the responsibility of taking care of large colonies of griffon and Black Vultures (Sierra de San Pedro (Special Protection Area for the birds), Sierras centrales in Badajoz, Monfrague National Park).

AMUS has huge expertise not only in the reception of chicks and fledglings suffering from the extremely high temperatures due to the climate crisis, but also in stages of reproduction, incubation, and growth of chicks with tutors to be eventually released. We have acquired deep knowledge in illnesses we have been treating for decades with the collaboration of universities and public investigation centres.

In the last ten years, the medical challenges have launched us towards an innovative trauma medicine (bone grafting in raptors) in very valuable individuals of bearded, Egyptian and Cinereous Vultures, etc.

In short, we would love to make the world see through this Congress where we are, and where we want to be thanks to the co-participation of all.

Keywords: Griffon Vulture, Cinereous Vulture, reintroduction, recovery, wildlife

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Griffon Vulture (*Gyps fulvus*) as a potential sentinel of human pathogenic cephalosporin-resistant *Escherichia coli*

The emergence of bacteria resistant to critically important antimicrobials represents a worldwide health concern. Embracing the One Health concept, wildlife has been increasingly reported as carriers of antimicrobial-resistant bacteria due to their close contact with livestock and human waste. Between 2019 and 2020, cloacal swabs from 234 Griffon Vultures were collected from a landfill located in the region of Osona (Catalonia, NE Spain). Samples were plated with ceftriaxone (1 mg/mL) to select for cephalosporin-resistant *Escherichia coli* (CR *E. coli*). Minimal inhibitory concentration was determined for 14 antibiotics. Antimicrobial resistance gene profiles were determined by whole genome sequencing, and phylogeny was inferred including 241 published sequences of *E. coli* ST131 from humans, companion animals, livestock, and wildlife. A total of 90 Griffon Vultures (38.5%) were colonized with CR *E. coli*. All of them carried at least one gene conferring resistance to beta-lactamases. Besides, 28 (31.1%) of these isolates harboured the CTX-M-15 gene, commonly associated with multidrug-resistant clones with pathogenic potential for humans. A clear correlation was found between phenotypic and genotypic resistance profiles for most of the antibiotics tested. A total of 30 different multilocus sequence types (ST) were identified comprising the 8 different Clermont phylotypes. Three *E. coli* isolates from the pathogenic and clinically relevant lineage ST131 were detected. Phylogenetic analyses clustered these isolates more closely related to human *E. coli* ST131 than *E. coli* ST131 isolated from livestock. Overall, this study detected a high prevalence of CR *E. coli* isolates from Griffon Vultures in Catalonia. The identification of the pathogenic lineage ST131 closely related to human isolates suggests the transmission of pathogenic and multidrug-resistant bacteria from humans to this species and most probably to others feeding at landfills. Therefore, this species may serve as sentinel of the antimicrobial-resistant bacteria burden and environmental contamination effects of human waste disposal sites.

Keywords: Griffon Vulture, Gyps fulvus, sentinel, antimicrobial resistance, AMR

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Longevity record verified in wild Griffon Vultures: t he importance of monitoring supplementary feeding stations for avian scavengers

Supplementary Feeding Stations (SFS) are widely implemented in the Iberian Peninsula as a conservation tool to promote the recovering of populations of endangered avian scavengers. Monitoring the use of these structures can provide useful information on species' feeding habits and activity patterns, as well as record tagged individuals making it possible to determine their life history traits. The Griffon Vulture (*Gyps fulvus*) – one of the species that uses SFS most frequently – is characterized by having higher mortality rates in juvenile individuals than adult and sub-adult birds. However, there is limited information regarding their longevity. To date, the maximum lifespan documented for Griffon Vultures is 41.4 years old in captivity and 17.2 years old in the wild. From 2016 to 2022, we monitored a total of eight SFS in Northern Portugal as part of three different projects by using motion triggered cameras. Throughout these seven years of monitoring activity, we recorded 47 marked Griffon Vultures and collected more than 160 observations of these individuals. Within these, we have documented several old adults Griffon Vultures: two individuals ringed in 1998, one ringed in 1997, and another one ringed in 1996. The latest is the oldest Griffon Vulture ever recorded in the wild, 25 years old on 19th August 2021. Furthermore, this bird is the second oldest wild vulture of the genus Gyps ever recorded, only surpassed by a Cape vulture (*Gyps coprotheres*) documented in South Africa with 31.2 years old in 2012. These records shed light on the longevity of one of most abundant old-world vultures, which can be considered in species assessments and when developing action plans for vulture conservation.

Keywords: Supplementary Feeding Stations, *Gyps fulvus*, Longivity, Portugal, Lifespan

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1 - Grupo de Investigación en Biología de la Conservación (GIC). Universidad de Extremadura.

Interspecific competition for nesting sites among scavenger raptors in Extremadura, Spain: Current status and trend

Extremadura (SW Spain) is one of the main ornithological areas in Europe, especially as far as scavenger birds of prey are concerned. The region hosts important populations of two globally threatened vulture species, the Egyptian Vulture (*Neophron percnopterus*) and the Cinereous Vulture (*Aegypius monachus*). From a regional point of view, the Egyptian Vulture population is stable in Extremadura and currently comprises a total of 154 breeding pairs. On the other hand, the regional population of Cinereous Vulture is one of the most important in Europe, representing around 40% of the European population (1,210 breeding pairs), characterize by a growing trend in recent decades. These positive population trends also apply to the Griffon Vulture (*Gyps fulvus*), which has made Extremadura one of its main strongholds in Europe.

The increase in the populations of these three species is encouraging interspecific competition between them, mainly for nesting sites. Here we analyzed at regional level, the phenomena of nest usurpation by the Griffon Vulture towards the other two species studied. Our result shows a total of 724 occupied platforms, affecting up to 235 and 26 pairs of Cinereous and Egyptian Vulture, respectively. This positions the Griffon Vulture as the main competitor for both species, also regardless of the type of nesting substrates (tree or rocky). On the other hand, this competition was also analyzed at sector/colony level, where we found a higher number of misappropriation episodes in areas with a higher density of Griffon Vultures.

Knowing the competitive relationships between scavenger raptors in one of their main breeding areas is crucial for the design of management plans and measures for each of these species.

Keywords: *Aegypius monachus*, *Neophron percnopterus*, *Gyps fulvus*, Extremadura, nesting substrate, competence

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Vultures translocations: a model to evaluate the impact of genetics in species restoration

Translocations are increasingly used in species restoration, which might come as a surprise in that success rates are diverse. Almost simultaneously to the initiation of the first European reintroduction programs, DNA analyses started to reshaped the scientific landscape and shortly after being adopted by the academic community, genetics has been depicted as a potential game changer in conservation research. A more formal recent recognition of genetic diversity to ensure long-term resilient ecosystems hints towards a more direct role of genetics in applied conservation, but it remains to be tested how to marry both.

When it comes down to reintroduction success, vultures outperform many other vertebrates. Debates on what drives success for vultures typically touch upon the species' ecosystem services, the role of charismatic conservation pioneers and the shared and well-structured expertise and inclusive action planning. Vulture translocations are also under the radar of conservation geneticists in that they form an ideal test cases to evaluate the potential role of genetic analysis in guiding conservation actions, because of their well thought of sampling protocols enabling later phase evaluations.

Within this study we focused on the French Cinerous vulture (*Aegypius monachus*) reintroduction initiative which has been closely monitored. Samples collected since the start, including both released birds as well as local recruits, were genotyped to create detailed pedigrees. The resulting data was subsequently aligned with field observations on reproduction and breeding biology. Likewise the genetic diversity - and signature of the French population was contrasted against data spanning the species' distribution range to evaluate overarching conservation goals including the restoration of geneflow between populations.

Within this presentation we highlight how genetics can be an interesting fine-tuner and process evaluator as in the case of vulture conservation both also describe more broadly how genetics can help conservation when less observation data is available.

Keywords: Conservation genetics, Translocations, Cinereous Vulture

Marta Herrero Villar[1]; Mark Taggart[2]; Rafael Mateo[1]

1 - Instituto de Investigación en Recursos Cinegéticos (IREC); 2 - Environmental Research Institute (ERI)

Monitoring veterinary pharmaceutical residues in livestock carcasses and avian scavengers: new compounds in the spotlight

Pharmaceuticals are emerging contaminants, some of which reach avian scavengers through their trophic chain when they consume previously treated domestic animal carcasses. This is concerning in the EU, especially after the detection of the first case of diclofenac intoxication in one Cinereous Vulture (*Aegypius monachus*) in Spain. Here, we analysed 49 commonly used veterinary pharmaceuticals, including antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), external antiparasitic drugs and one antimuscarinic drug. We analysed tissues from livestock carcasses (n = 159), avian scavenger livers (n = 116) and plasma from captured vultures (n = 312) collected in Aragon (NE Spain) and nearby regions using liquid chromatography with electrospray ionization mass spectrometry (LC-ESI-MS/MS). We detected pharmaceuticals in 54.1% of livestock tissues analysed (50.3% with antibiotics, 10.8% with NSAIDs). For tissues and plasma from avian scavengers, we detected pharmaceuticals in 51.7% and 28.5% of samples, respectively. Antibiotics were detected in 50.9% and 25.3% while NSAIDs were detected in 6.0% and 5.5% of tissues and plasma collected from avian scavengers, respectively. We detected highly toxic NSAIDs like diclofenac, flunixin and ketoprofen in livestock carcasses and/or in plasma and liver of vultures. Several pharmaceuticals were detected here for the first time in livestock carcasses or vultures. The biomass of pig and chicken carcasses supplied at feeding stations was a significant determinant of the presence of pharmaceuticals in plasma of avian scavengers captured there. Carcass deposition for avian scavenger feeding must always address the potential risk posed by veterinary pharmaceuticals and mitigation measures should be implemented to stop these compounds entering vulture trophic chains.

Keywords: Vultures, carrion, diclofenac, Spain, antibiotics

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Caffeine as a biomarker of landfill use in Griffon Vulture

Caffeine is one of the most consumed psychostimulant substances in the world. This highly psychoactive compound has been described in leachate from domestic waste present at landfills at variable levels, which indicates the wide presence of used coffee grounds and other sources of caffeine in the domestic rubbish. Here, we describe for the first time the presence of caffeine in plasma of captured Griffon Vultures (n = 298). Caffeine was detected in 58% of Griffon Vultures captured at supplementary feeding stations (n = 255) and in 97.7% of those captured in landfills (n = 43). We also sampled 14 Cinereous Vultures captured in landfills, in which caffeine was present in 71.4% of the samples. The geometric mean of caffeine concentrations in plasma were significantly higher in vultures captured in landfill sites (7.8 ng/mL) than in feeding stations (4.8 ng/mL). The main source of caffeine for avian scavengers is probably the mixed food waste with coffee grounds. The presence of caffeine in plasma of vultures from the supplementary feeding sites, even though at lower levels than in landfill sites, indicates the use of both sources of food in relatively short periods of time. This compound is highly psychoactive and even if birds are probably being exposed to relatively low levels, the potential behavioural effects remain unknown. Here we describe caffeine as a good biomarker of landfill use, but we highlight the need to explore potential effects for avian scavengers to this and other highly bioactive substances they might be exposed to through anthropogenic contamination in landfills.

Keywords: *Avian scavengers, landfill, feeding stations, coffee, bioindicator*

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Investigating the 2022 H5N1 outbreak in French Griffon Vultures

Since 2011, an unprecedented epizootic of highly pathogenic avian influenza has been underway worldwide, following the emergence of an H5N1 variant from clade 2.3.4.4b. Wild bird populations have been dramatically impacted, especially colonial nesting species. The virus also reached populations not classically considered as targets such as Griffon Vultures (*Gyps fulvus*).

In spring 2022, an HPAI infection was detected in French Griffon Vulture populations: limited mortality in adult individuals and high mortality in juveniles were observed as well as reduced activity of adults. To understand the dynamics of the infection in this population of remarkable hosts, we set up a comprehensive study of the outbreak by combining serological, biomolecular, phylogenetic, and ecological approaches.

Two capture sessions were carried out (summer and autumn 2022) at four different sites covering the entire range of the French Griffon Vultures population. A total of 236 individuals were captured and sampled.

All the samples were screened for AIV by PCR and tested negative. In contrast, we detected a mean seroprevalence of 32% by H5 competitive ELISA (ranging from 0% to 59%). Positive samples were confirmed by HI as positive for antibodies directed against H5 2.3.4.4b clade.

Phylogenic analysis indicated a likely unique introduction in vultures populations, probably located in Spain and analysis of telemetric data showed an overlapping of the distribution areas of several French and Spanish individuals at the time of the outbreak.

The large-scale introduction of HPAI virus in a naive population led to numerous direct or indirect deaths of juvenile individuals, resulting in a sharp drop in yearly breeding success. On the other hand, adult individuals seem to have coped well with the infection which caused only a drop in activity and a limited mortality. To date, one can reasonably assume that the virus is no longer circulating in this population.

Keywords: Avian influenza, HPAIV, Griffon Vulture, virology, serology, phylogeny, ecology

Shannon Hoffman[1]

1 - Bred 4 the Wild Bearded Vulture Breeding Programme

Bred 4 the Wild – Managing the southern Bearded Vulture for ex-situ breeding success

In the southern tip of Africa there is a last remnant group of Bearded Vulture (*Gypaetus barbatus* meridonalis) living high up in the Maloti-Drakensberg mountains that serrate the border between the countries of South Africa and Lesotho. Over recent decades this genetically distinct population has declined by at least 30%, with less than 350 birds now left in the wild.

The Bearded Vulture Recovery Programme is a cross-border, cross-cultural conservation programme of people standing together to prevent the extinction of this iconic scavenger. The Bred 4 the Wild Bearded Vulture Breeding Programme is a pro-active conservation initiative purposed to build and maintain an ex-situ genetic reserve and to supplement the dwindling in-situ population. Without captive birds to breed with, turning this theory into a practical reality is challenging. The cainism behaviour of the species allows for egg harvesting to create an ex-situ founder breeding population. An implemented second-egg harvest protocol, initiated in 2015, proved too conservative to create an age-compatible founder group and has been subsequently altered with success.

The ex-situ founder group is obviously only an effective conservation tool if the birds themselves are behaviourally sound and able to reproduce and raise chicks suitable for release. To achieve this, and guard against imprinting, a three-pronged raising approach was incorporated. As the first chicks reach sexual maturity, the programme now stands on the cusp of discovering whether this combination of social rearing, puppet feeding and visual exposure to a live adult will produce the desired results.

In the pursuit of best possible practice and programme evaluation, these management successes and failures will be shared.

Keywords: Bearded vulture, in-situ egg harvest, founder group creation, puppet raising, social rearing

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Tackling the infectious threat: vaccination against West Nile Virus in captive Bearded Vultures

Over the past decade Bearded Vultures (*Gypaetus barbatus*), especially in captivity, have shown to be highly susceptible to lineage 1 and 2 West Nile virus infections, with both acute mortality and deaths due to secondary infections such as Aspergillosis in West Nile virus infected individuals. As this is a serious threat to captive breeding programs, a vaccination was initiated in 2021 and 2022 in Spain using the only commercially available vaccine in the country (equip WNV). Based upon previous information the vaccination protocols included three intramuscular injections at one-month intervals and an annual re-vaccination. Blood samples were taken in all birds at each vaccination and tested by competition ELISA and viral neutralization test (VNT). While all but one anergic individual that died from Aspergillosis tested markedly positive in the competition ELISA, the vaccine elicited a consistent neutralizing antibody response in most individuals only after the third vaccination, with higher neutralizing antibody titres in adult than in juvenile birds. Individuals that had been exposed to WNV prior to the vaccination had higher WNV antibody titres than previously unexposed birds. In the two birds in which vaccination had started in 2021 the antibody titre of the previously WNV exposed individual remained high, while those of the unexposed individual had vaned by the time of revaccination. The results suggest that the implemented vaccine program with the currently available vaccine results in a robust response in previously WNV exposed individuals and a more limited response in those that had not been previously exposed to WNV. The latter is likely still protective of death and disease, but duration of the response is shorter and may require earlier re-vaccination.

Keywords: West Nile virus, Bearded vulture Gypaetus barbatus, Vaccination

Poster presentation

Marleen Huyghe[1]; Alex Llopis Dell[1]; Pablo Izquierdo[2]

1 – Vulture Conservation Foundation; 2 - GREFA

Cinereous Vulture timeline

Early 2023, EAZA Best Practice Guidelines were published for Cinereous Vulture (*Aegypius monachus*), including know-how from EEP zoos (EAZA), GREFA (Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat) and VCF (Vulture Conservation Foundation). This voluminous document is a tool for persons responsible to breed with the species.

The poster "Cinereous Vulture timeline" summarises in a visual way the management required for this species within the EEP breeding network, indicating month by month the actions needed and is meant for people responsible for day to day care of this species, helping them to provide the best possible conditions to house and breed with the species.

Fixed on the wall in a highly visible place it is educational and a very nice decoration. But most of all, an instant reminder for daily actions.

Keywords: Best Practice Guidelines, Husbandry and breeding management ex situ, practical visual tool

Marleen Huyghe[1]; Alex Llopis Dell[1]; Evelyn Tewes[2]

1 – Vulture Conservation Foundation; 2 - Black Vulture Conservation Foundation

Analysis of various release techniques for Cinereous Vultures to determine key factors for an optimal release strategy

The various release techniques for Cinereous Vultures (*Aegypius monachus*) used in Spain, France and Bulgaria were compared and analyzed. The first experience in translocating Cinereous Vultures was achieved on the island of Mallorca, where reinforcement started in 1984. The Black Vulture Conservation Foundation, who monitored the reinforcement project, adapted the methodology used for hacking and acclimatization aviaries, which had been used with success in the Bearded Vulture in the Alps.

In the next release/translocation projects in France, Spain, and recently in Bulgaria, both acclimatization aviaries and hacking were used, depending on the age of the bird and the number of birds available. The comparative analysis of the data from the diverse release projects and the interpretation of these results as a function of the biology of the species, revealed different key factors that had an impact on the reintroduction/ translocation of Cinereous Vultures: conditions of release in relation to stress, young birds showing more movements, the residence time in the aviary in respect to the settlement rate, the geographical location, the feeding management strategy, the attraction by conspecifics in the vicinity, the presence of heterospecifics at the release site, the effect of releasing larger groups on the degree of settlement, the presence of conspecifics increasing fixation on the area and the impact of the dispersion area of the original breeding colony on translocated birds.

Taking into consideration these key factors, preliminary guidelines for an optimal release strategy for the species can be developed.

Keywords: release strategy, reintroduction practice, Cinereous Vulture, translocations

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First breeding attempts of Bearded Vultures in the Alto Najerilla Natural Park (La Rioja, Spain)

It is estimated that the Bearded Vulture disappeared as a breeder from the northern Iberian System in the 1960s. The first feasibility study for the recovery of the species was carried out in 1998.

The Alto Najerilla Natural Park (La Rioja) has been frequented for more than 20 years by different individuals of Bearded Vultures. Many of them come from reintroduction projects (Maestrazgo and Andalusia) and are equipped with GPS. Another part come from the Pyrenees, most of them unidentified. The presence of up to five individuals at the same time has been recorded.

In recent years, several campaigns have been carried out to prevent poisoning and to adapt power lines. Some supplementary feeding points have also been maintained for this species.

Since 2016, Cenarbe, an adult male from the Pyrenees with wing tags, has been frequenting the area. In February 2021, Biescras, an adult Pyrenean female equipped with GPS by the Government of Aragon, began to visit the area. In September they were observed together. The nest was detected in December and lay was confirmed on 23 January 2022. The couple completed the incubation period and the egg was finally found to be infertile.

In 2023, they made a new nest about 50 metres from the previous one and the clutch was laid on 20 January. After 31 days of incubation, the egg was found to be broken without being able to determine the cause. A few days later, the female moved to the Pyrenees and on her return journey, she was found dead in the vicinity of Moncayo mountain.

Field monitoring and control of the reproduction has been carried out by forestry agents and technicians from the Directorate General of Biodiversity of the Government of La Rioja.

Keywords: *B*earded vulture, breeding, La Rioja, Parque Natural Alto Najerilla

Samuel Infante[1]; João Albuquerque[1]

1 - Quercus A.N.C.N. associação de conservação da natureza

Monitoring a Cinereous Vulture colony from 2010 to 2022 in Tejo Internacional Natural Park - Portugal

Thanks to conservation efforts in 2010 the Cinereous Vulture (*Aegypius monachus*) returns as breeding specie to Portugal, after 40 long years of extinction. This is a Critically Endangered species in the country with only 39 pairs in three breeding colonies in 2022. 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, and collecting ecological data allowed these two couples to become the largest Portuguese colony of Cinereous Vulture with 29 breeding pairs in 2022. Between 2010 and 2017 the colony has less than 10 pairs, in 2017 eleven and in 2018 the colony grew to 24 and in 2021 had another jump to 28 pairs. The area of the colony is with Mediterranean forest of evergreen and cork oaks (*Quercus ilex* and *Q. suber*).

We collect Information about ecological behaviour and treats. In the period (2010-2022) Cinereous Vultures nested in mainly (*Quercus ilex*) trees n=42 and 4 in artificial platforms (associates to (*Quercus ilex*). The negative incidence of disturbance caused by hunting, forestry and beekeepers on breeding success has been claimed as the main cause of the colony's failure.

These activities may promote breeding failure in some nests, mainly because of the continuous presence of people and vehicles in the area. Infrastructures facilitate the entry of people and vehicles in wild areas near the nests cause failure. Illegal poisoning and, during the last years, also due to indirect poisoning with Pb from hunting activity, we found individuals with high concentrations in blood (20,1-68,0 µg/dL).

Liam Innis[1]

1 - Renewables Grid Initiative

RGI's Bird Portal - Working with grid operators and civil society for bird protection around the grid

RGI is a unique collaboration of European NGOs and transmission system operators engaging in an 'energy transition ecosystem-of-actors'. We promote fair, transparent, sustainable grid development to enable the growth of renewables to achieve full decarbonisation in line with the Paris Agreement. Environmental protection around energy infrastructure, e.g. bird protection around the electricity grid and wind turbines, is a core pillar of our work.

At European level, we advocate for better bird protection within the energy transition, raise awareness about best practices (spatial planning, risk mitigation), organise discussion events, and foster new collaborations between civil society, industry, and academia. We collaborate with the IUCN's 'Energy Task Force'; contribute to publications on bird-grid protection; and create communication materials (videos, brochures, campaigns) to raise awareness on collision, electrocution, and solution strategies. Given their high mortality risk from electrocution and collision, our work helps to ensure safer spaces for vultures across Europe and beyond.

RGI fosters industry-NGO collaborative projects at national level. One example is the German 'Bird Portal' project. Founded in 2017, this collaborative endeavour between NABU (BirdLife Germany) and 7 grid operators aims to improve the information basis for bird protection measures through a portal whereby anyone finding dead birds around powerlines can register it for follow-up by project partners. The public is directly engaged in a citizen-science endeavour to support better bird protection around the grid. The project also oversees a cross-sectoral 'Bird marker' working group and creates space for grid operators and NGOs to exchange on key topics such as permitting, collaborative planning, and policy developments related to nature protection in energy infrastructure. In Germany, the vulture species implicated are griffon, cinereous, bearded, and Egyptian.

We strive to help others to replicate the successes of this project and engage with international partners to discuss logistical steps to supporting similar endeavours.

Keywords: collaboration, electricity grid, electrocution, collision, citizen science, power lines

Ivelin Ivanov[1]; Emilian Stoynov[2]; Georgi Stoyanov[3]; Simeon Marin[1]; Hristo Peshev[2]; Ilian Stoev[1]; Lachezar Bonchev[2]; Jovan Andevski[4]

1 - Green Balkans; 2 - Fund for Wild Flora and Fauna; 3 - Birds of Pray Protection Society; 4 - Vulture Conservation Foundation

Large vultures' reintroductions in Bulgaria, update 2023

The LIFE08 NAT/ BG/278 and LIFE11NAT/BG/363 projects have successfully restored the Griffon Vulture as a nesting species in the Balkan Mountains and Kresna Gorge in Bulgaria after the species has been considered extinct for over 70 years in these particular sites.

Between 2010 - 2023 close to 400 Griffon Vultures were released from 5 different adaptation aviaries. 150 – 180 birds settled in 4 areas, with breeding colonies restored with 49-60 breeding pairs, which raise 30+ chicks annually.

LIFE14 NAT/BG/000649 brought Cinereous Vulture back from extinction as a nesting species in Bulgaria since the 1970s.

In total, 79 Black Vultures were imported to Bulgaria in 2018-2023: 73 were released, and six were/became non-releasable and transferred for captive breeding.

Ten were released by hacking (5 from a tree hack in Kotel and five hack-fledged from an aviary near Sinite Kamanai Nature Park, of which five are alive - 3 in the wild, which eventually settled in the area of Cankiri in Turkey, Dadia in Greece and Kotel in Bulgaria respectively, while two were recaptured alive and transferred to the EEP.

In total, 63 individuals were released by aviaries: 33 in Eastern Balkan Mountains (EBM) and 30 in the Vrachanski Balkan Nature Park (VBNP).

The adaptation aviary method performs better in settling the released individuals in the area of release compared to the hacking (artificial nest) method.

In total, eleven-twelve pairs have formed up to mid-2023 - 5 in EBM and 6-7 in VBNP. Pairs have reproduced in 2021 (n=2), 2022 (n=3) and 2003 (n=4) seasons and successfully reared chick in 2021 (n=1), 2022 (n=2) and 2003 (n=3 hatched).

Registered causes of death: depredation (10), poisoning (8), drowning (3), shooting (2), exhaustion (2), preceding health problems (2), electrocution (1), collision with power-line (1), hit by train (1), natural disaster (1), collision with vineyards wires (1).

Keywords: Vulture reintroductions, Bulgaria

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Griffon and Cinereous Vultures delayed release of captive-bred individuals in reintroduction programmes in Bulgaria

Of about 400 Griffon Vultures released in Bulgaria since 2009, 48 were captive-bred individuals provided by zoos and breeding centres. All were released from acclimatisation aviaries in their second, third or fourth year, and the results show the rate of successful acclimation was higher than that of the classic release by aviary of wild translocated/ rehabilitated individuals. Eventually, this is mainly due to the lack of emigration in captive-bred individuals. Although we did not experiment classic hacking release of Griffon Vultures - fledging from an artificial nest. Thus we could not compare it with the delayed release using acclimatisation aviary, but the last mentioned shows satisfactory results and is an alternative for long-term reintroduction programmes from logistics and efforts cost. From 9 released Cinereous Vultures by classic hacking in Bulgaria in 2018-2022, only 0.22 survived the first winter, but all emigrated and settled elsewhere and were lost for the particular reintroduction project area. By chance, a captive-bred juvenile Cinereous Vulture appointed for classic hacking release was kept in an acclimatisation aviary over the first winter and released in the spring of its second year. Thus, in practice, it was involved in a delayed release. We report the first observed results, which so far seem promising. We suggest applying an experiment with increasing the number of released individuals through this method to 10 to compare the results with the classic hacking for the project in Bulgaria. The development, adaptation and fine-tuning of the release methods is an essential part of the reintroduction programmes to obtain better results on lower resources and effort costs, especially in species where the available individuals or release are scarce and extremely precious.

Keywords: hacking, acclimatisation aviary

Pablo Izquierdo[1]; Irene Farias[1]; Ángela Herencia[1]; Adhara Cabello[1]

1 - GREFA

Early development of Cinereous Vultures (*Aegypius monachus*). Building a photographic archive

The Cinereous Vulture (*Aegypius monachus*) is a near threatened species of old world vulture. With many conservation initiatives being carried on, the regular monitoring of the colonies is a keystone task. In order to improve the knowledge of the different features of this species during early development, we have gathered detailed photographs of 12 captive-bred birds, including weight and feather patterns, to establish a photographic archive. This ongoing project will provide a useful guide of the species' development for practitioners, both field technicians and aviculturist involved in the captive management of the Cinereous Vulture.

Keywords: cinereous vulture, captive breeding, bird development

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Impact of climate change on the habitat suitability of three critically endangered vultures in northern India

Vultures are a most periled yet insufficiently studied scavenger guild. Indian (IV), Red-headed (RHV) and White-rumped (WRV)- three critically endangered vultures have declining population trends. Habitat, a proxy of population, is known to be impacted by climate change. This study is aimed at assessing changes in future(s) habitats from the present and identifying responsible factors influencing changes using MaxEnt SDM. Modelling improvement was ensured by correcting sampling and latitudinal bias, and multicollinearity effect. To further increase the accuracy of prediction of future scenarios (RCP4.5 and RCP8.5 of 2050 and 2070), GCMs' (CCSM4, HadGEM2AO and MIROC5) ensemble were also used. Thirty-nine models/predictions were made and their robustness was evaluated using AUC (0.90-0.97) and CBI (0.804-0.961). The top three bioclimatic variables for RHV and WRV were similar (bio09, bio13 and bio08) but differed in IV (bio15, bio08, bio03). This indicated a similarity in habitats between the former two but dissimilarity with the latter which was further underscored by the wider spread of suitable habitats (forested plain) for RHV and WRV as opposed to narrower one in IV (cliffs and hills). In the present-day scenario 15% (RHV), 16% (WRV) and 10% (IV) of the studied area (240928 km2) was found to be suitable which fluctuated up to 5% net loss in RHV and WRV but up to 1% net gain in IV. Though the models could be further improved by removing limitations, the instant prediction results could be taken as reference and used from a management perspective while developing conservation strategies by the concerned agency. Landscape level vulture centric planning must be done by maintaining the suitable areas as vulture safe zones. The vulnerable areas should undergo habitat improvement by increasing nesting and roosting site and food availability through agroforestry practices.

Keywords: MaxEnt, habitat drivers, emission scenarios, SDM, landscape management

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Reintroduction of Bearded Vulture in the Maestrazgo (E Spain). Are we achieving the expected results?

Our project began in 2014, forging an alliance between state and regional administrations and the VCF, which allowed us to start releasing captive-born chicks in 2018. Since then, 2-3 have been released each year, so that until 2022 11 chicks had been released. Although the sample size is still small (in 2023 we are releasing 3 more chicks) it is time to assess whether we are achieving the objectives set:

Reproduction of the species: being in the 5th year, it is too early to achieve it, since the first reproductions take place after the 8th year.

Survival: Of the 11 birds released, only 3 deaths are recorded: two chicks in their first weeks of flight, presumably due to Golden Eagle attack, and 1 due to electrocution in Guadalajara, far from the reintroduction area. Therefore, survival is 72.7%, considered high among reintroduction projects.

Homing: Of the 8 surviving birds, only 1 (Alós, released in 2018) has not returned to the release area during 2022, while the others remain there permanently or visit it regularly.

Building bridges: Initially the project intended to establish connections between the Maestrazgo with Cazorla in the South and with the Pyrenees and the Cantabrian mountains in the North. No specimen has moved south. During 2022, of the 8 alive, 3 travelled to the Pyrenees, 1 to the Cantabrian mountains, 1 to the North Iberian mountain range (La Rioja) and another to the Iberian mountains and the Pyrenees.

Therefore, the evaluation of the results of the project is positive, although the successful reproduction of the species in the area remains to be achieved. Another factor that deserves some reflection is the lack of connection with the population of Andalucía, made worse by the lack of birds released in southern Spain that come to the Mediterranean.

Keywords: Bearded Vulture, reintroduction, Maestrazgo, Spain, evaluation

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Characterization of „silky“ phenotype in the European Bearded Vulture (*Gypaetus barbatus*)

The Bearded Vulture (*Gypaetus barbatus*) experienced an absence within the entire Alpine range for over 80 years. Based on a captive breeding program, the species has been reintroduced to the Alps and currently counts over 300 individuals. Unfortunately, between 2009 and 2016 three wild fledglings were recaptured due to their inability to fly caused by feather abnormalities.

Various factors can impact feather development and may potentially interact with each other. For instance, an excessive burden of mites or viral infections can induce feather abnormalities. Nevertheless, the affected birds underwent examinations that yielded no pertinent findings. Since the abnormality persisted even after molting, an environmental factor (e.g., toxins, nutrient deficiencies) seems less likely. The three affected individuals show higher inbreeding coefficients to one common ancestor. Therefore, it seems plausible, that the origin of the problem is due to the inheritance of a mutation expressed homozygote.

Multiple variations in the feather morphology of chickens and pigeons have been described, primarily attributable to breeding practices. Similar phenotypes to the observed feather abnormality are exhibited by the recessively inherited silky feather mutation in both bird species. In chickens, the interlocking hooklets are missing, whereas in pigeons, they are malformed and fail to function properly.

We investigated feathers from the affected birds with Electron microscopy, which showed hooklets are present in the abnormally formed feathers. Further, the observed number of affected birds is in line with the expected proportion of inbred birds specific to the founder with the potential mutation. The coding region identified in chickens is conserved in the Bearded Vulture and we sequenced 20 individuals for the respective region.

The findings from this study have the potential to provide valuable insights for all wild bird species, given the relative conservation of feather formation and development processes between different bird groups.

Keywords: Bearded Vulture, feather abnormality, silky phenotype, inbreeding

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Current status of Griffon Vulture (*Gyps fulvus*) in Greece: population monitoring results and identification of critical habitats

The Griffon Vulture (*Gyps fulvus*) is among the most threatened bird species in Greece; only the Cretan population can be considered stable and sustainable, while those in the mainland and Naxos island are still under an unfavorable conservation status and considered as Critically Endangered. In the framework of the conservation project LIFE IP 4 NATURA (LIFE16 IPE/GR/000002) a national Multi-Species Action Plan (MsAP) for the Griffon, Cinereous and Bearded Vultures was elaborated that resulted in a Ministerial Decision, meanwhile its implementation is being coordinated by the Hellenic Ornithological Society/BirdLife Greece. Through the MsAP and in cooperation with other research institutes and state authorities, a systematic monitoring scheme was carried out during 2020-2022 throughout Greece, a task that enabled a constant and credible population assessment of the species in Greece. At the same time, telemetry data collected from 59 radio-tagged griffons (part of equipment kindly provided by other research institutions) led to the delineation of the hot-spot areas for the species conservation in Greece (i.e. sensitivity mapping). Currently the species population numbers ca. 426 breeding pairs (around 85% of which are in Crete) with 70% of them raising successfully young. Overall monitoring results show a slight positive trend for the species population (10% in mainland Greece and 15-20% in Naxos) compared to the baseline data presented in the MsAP. This increase was the product of a systematic effort for mitigating the main threats for vultures in Greece during the last 5 years. Management actions will be intensified in the near future focusing on priority areas for conservation determined as Sensitivity Zones of Critical and High importance for the species.

Keywords: Griffon Vulture, Greece, Vulture Multi-species Action Plan, population monitoring, sensitivity mapping

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Griffon Vulture (*Gyps fulvus*) in Kazakhstan

The Eurasian Griffon (*Gyps fulvus*) vulture is a large species with a vast range spanning from the Iberian Peninsula in the west to the Himalaya and Central Mongolia in the east. Kazakhstan lies on the northernmost edge of the species' distribution range and according to literary data, in the 20th century it was considered a common species in Kazakhstan. However, there is no recent robust estimation of species abundance and distribution and in recent times researchers found that Griffon Vulture was in the past often mistaken for the Himalayan Griffon Vulture, resulting in the need to question everything known about the species in Kazakhstan. Hence, the aim of the current study was to review published data on the Eurasian Griffon Vulture in Kazakhstan as a first step. As a second step, we aimed to validate field data by visiting colonies and establishing species status and abundance in Kazakhstan. The only confirmed breeding colony of the species in the country is in the Karatau mountains where we focused our efforts. Cases of Griffon Vulture found nesting in other regions are rare or absent.

We counted the number of occupied nests in two different years – 2010 and 2022 — and we registered more than a 90% decrease in the number of active nests. In 2010, 78 active nests were found opposed to only seven found in 2022.

The reasons for the rapid decline in the number of Griffon Vulture are poorly understood. Official data from the Kazakhstan government authorities confirms that non-steroidal anti-inflammatory drugs (NSAIDs) containing diclofenac and ketoprofen are used in the country. Meanwhile, despite the critical drop in numbers, the Griffon Vulture is still not a protected species in Kazakhstan. We recommend urgent measures to understand the scale of the reported threats and the implementation of conservation actions.

Keywords: *Gyps fulvus*, Griffon Vulture, decline, Kazakhstan, NSAIDs

Poster presentation

Nikos Kassinis[1]

1 - Cyprus Game and Fauna Service

Overview and analysis of mortality causes for the Griffon Vulture *Gyps fulvus* in Cyprus

Since the 1990s, the Griffon Vulture population in Cyprus has suffered from frequent mortality events. Poisoning incidents have been identified as the leading cause of mortality events in recent years while information provided by recently deployed GPS tags on birds reveal the impacts of energy infrastructure to the population. Population Viability Analysis modelling predicts that under current conditions, the species will go extinct within 15 years, due to a continuing decline largely driven by frequent poisoning incidents. Data and information related to mortality events were gathered for the period 1996 – May 2023 from databases held by relevant authorities and the recent work of the Anti-poison Dog Units (ApDUs) established under the four-year (2019-2023) 'LIFE with Vultures CY' (LIFE18 NAT/CY/001018), a EU-funded species conservation project. It is estimated that between 1996-2023 there have been 70 mortality cases recorded, with 78,6% caused by poisoning, 5,7% by Collision/electrocution, 4,3% shot, 2,9% lead poisoning, 1,4% drowned, 7,1% uknown. However, systematic and standardised recording of poison cases has only started recently with the operation of the first ApDUs for Cyprus. These data provide valuable information on the substances used in poison baits and on the impact of this illegal practice, while they also contribute in identifying areas and periods of the year with high poisoning risk. The information has been collated in one mortality database for the Griffon Vulture population in Cyprus and the results deriving from the analysis of these data guide implementation of conservation actions in a targeted manner. The data illustrate the frequency of poisoning events, impacts to the population, losses to collision and electrocution, illegal and banned use of toxic substances used in poison baits thus providing an overview of the situation in Cyprus in the last 27 years.

Keywords: Griffon Vulture mortality, poisoning, collision, electrocution

Corinne Kendall[1]

1 - North Carolina Zoo

Using survival analysis from telemetry and transects to assess short-term population trends in vultures

Determining short-term (<10 years) population trends in vultures is critical for their conservation, both to understand threats and ecology of the population but also to evaluate conservation interventions. Telemetry studies can be used to estimate survival rates, and has become a common tool for assessing population trends, but cost can limit sample size. Transects can be useful for assessing changes across multiple species, but can be affected by variation in survey conditions and large confidence intervals due to natural variation in vulture numbers. We used two methods to assess population trends in three protected areas in southern Tanzania over 6-8 years: satellite telemetry data primarily from White-backed vultures to estimate survival rates, with corresponding population trajectories based on population models, and transect counts for seven scavenging raptors. We incorporated carcass presence into transect models to account for aggregations of vultures that can occur when these are along transect routes. Both methods suggest declines for White-backed vultures in Ruaha and Nyerere National Parks, while only telemetry estimates suggested significant declines in Katavi National Park. Mortalities recorded from telemetry show that poisoning is prevalent while highlighting the challenges of determining cause of death when working across large, rugged landscapes. Despite these declines, southern Tanzania remains an important stronghold for African vultures with higher current encounter rates than elsewhere in East Africa. However, preventing further declines will heavily depend on the ability to mitigate the threat of poisoning. This study demonstrates the value of using multiple techniques when attempting to understand population trends in vultures over short time periods.

Keywords: population trends, Africa, survival analysis, conservation

Sebastián Kohn[1]; Fabricio Narváez[1]; Juan Sebastian Restrepo-Cardona[1,2]; Rubén Pineida[1]; Evelyn Araujo[1]; Paul Monar[1,3]; Hernán Vargas[4]

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Andean Condor Research and Conservation in Ecuador

Vultures are one the most threatened group of birds worldwide. With a global population of less than 6700 adult individuals, the Andean Condor (*Vultur gryphus*) is listed as a Vulnerable species, while the population in Ecuador is Endangered. The Andean Condor Research Project in Ecuador was initiated in 2012, with the aim of increasing knowledge on population biology, movement ecology, conservation threats, and identifying actions to conserve Ecuador's national bird. The team has tagged 19 condors with wing-tags and satellite trackers which have provided detailed information on spatial use. Field crews have followed these condors to over 500 different roosting and nesting sites where they have documented over 25 egg-laying events. Data shows that condors can breed year-round. Mortality and rescue records, for the period 1979 to 2021, have been compiled and analyzed. Camera traps have been set up at carrion sites to understand the structure of the community of scavengers. Genetic and movement data show that condors from Ecuador are isolated genetically and geographically from other populations The 2018 national population census reached the alarming conclusion that there are only about 150 condors left in Ecuador, and subsequently, we lost at least 20 individuals mainly due to human-free-ranging dog conflicts and illegal hunting. At least 90 Andean Condors died due to poisoning with pesticides, and large numbers of free-ranging dogs likely compete with them for food sources inside protected areas, and also attack domestic livestock, causing rural communities to retaliate by poisoning carcasses. To address these threats local and national governmental authorities must make a real commitment and deploy the personnel and funds needed for educational, dog sterilization, and feral dog eradication campaigns, as well as fund research and base important policymaking decisions on the results of this research.

Keywords: Andean condor, research, conservation, Ecuador

Keith L Bildstein[1]

1 - Hawk Mountain Sanctuary (Retired)

Future potential advances in vulture conservation

Four factors drive the rate of success in vulture conservation: serendipity, advancing technology, collaboration, and the appearance and acceptance of new ideas and paradigms. All three of these factors are thriving in current vulture conservation biology. First historic and recent declines in both New and Old World vultures have alerted conservation biologists to the plight of many vulture populations that have spawned may conservation cation. Second, advancing technology in the form of GPS and satellite tracking have increase our abilities to map both short and long distance travels of individuals and small group of vultures across their occupied landscapes. Third, collaboration, and fourth a new appreciation for the population dynamics and ecological flexibility of vulture provides us with a new and useful paradigm for understand the biology of vultures. These three factors, together with our recognition of areas in need of study, all but ensure success. As we move to the next stage, we need to keep all of the above in mind as we work together with the greater conservation community to strengthen our ability to provide increasingly accurate and timely conservation assessments of vultures globally.

I draw upon my own and others field work to identify how this can be accomplished.

Keywords: future vulture conservation

Alex Llopis Dell[1]; Francisco Rodíguez Peinado[1]; Carmen Calero Contreras[1]; Hans Frey[2]

1 – VCF - Vulture Conservation Foundation; 2 – EGS – Eulen- und Greifvogelstation Haringsee

The Bearded Vulture EEP and its contribution to the advance of knowledge about its biology

In 1978, the Bearded Vulture Reintroduction Project started in the Alps (FZG 832/78; WWF 1567/78) based on a captive breeding programme. This captive breeding network has been included in the European Endangered Species programme (EEP) since the EEP began, and is a VCF-coordinated network of zoos, animal parks, captive breeding centres and private collections aiming to breed this species in captivity for conservation purposes. At the beginning of the programme, due to the critical situation of the autochthonous populations, it was decided to use only the almost 40 captive specimens distributed in different European zoos. Most of these birds were transferred to the Richard Faust Centre in Austria. Paired birds and juveniles went back to the zoos, and so from 1978-1985 the European breeding network emerged and was a precursor of the later established EEP. Between 1978-2023 638 fledglings have been reproduced, from which 402 released in 5 still on-going projects and the programme currently houses 184 birds. All captive birds housed according to the EEP recommendations, have developed behavioural patterns like those of wild birds. The only observed difference has been in the frequency of, for example, copulations per reproductive cycle and pair in some captive birds. However, many of these behaviours were first described in captivity (the chick's cainism behaviour, the colouration of the plumage with mud rich in iron oxide, various aspects of reproductive behaviour like the hatchling process, chick's diet, parent-assisted hatching, etc) and have later been confirmed in the wild, thus allowing all information (both in situ and ex situ), to be compared and later applied to the conservation of the species. Thanks to this, new techniques in artificial incubation, pair bonding and chick rearing have made it possible to increase productivity within the programme.

Keywords: Bearded Vulture, captive breeding, in situ and ex situ conservation contribution

Alex Llopis Dell[1]; Hans Frey[2]

1 – VCF - Vulture Conservation Foundation; 2 – EGS – Eulen- und Greifvogelstation Haringsee

Best practice how to release Bearded Vultures into the wild

In 1978, the Bearded Vulture Reintroduction Project started in the Alps (FZG 832/78; WWF 1567/78) based on a captive breeding programme. Due to the biology of the species (territorial behaviour), the release method used for the Griffon Vulture (acclimatisation cage) was discarded, and a modified method of "hacking back" used by falconers to raise nestlings of falcons under more or less natural conditions was developed in the Richard Faust Zentrum (Austria) using offspring of black kites. The idea was to modify this technique for the goal of a reintroduction project using more natural conditions, knowing that imprinting on different nest types occurs. Therefore, Bearded Vulture nestlings are released by hacking method, introducing them in natural nest sites in caves or ledges at the age of 90 days old. The advantage of this method is that at that age birds can eat and prepare the food alone, are strong enough to defend themselves against other birds of prey or foxes and young enough to recognize the release site as their rearing place, ensuring that they return to the release site after reaching sexual maturity and settle down (philopatric behaviour). With this method birds fledge in a "natural" way showing the same behaviour as their wild conspecifics. Further, at that age learning and adaptation capacities is in their peak and by releasing minimum two nestlings per hacking site social contact is ensured, something important at that age. This give them the opportunity to learn from each other, impossible if adult birds are released as no colonial species. To ensure that the release process will be successful, it is very important that the birds do not suffer from any kind of stress. To this end, recommendations have been established regarding the location/characteristics of the hacking cave, diet and presentation, as well as monitoring.

Keywords: Bearded Vulture, reintroduction, release method, hacking

Franziska Loercher[1]

1 – VCF - Vulture Conservation Foundation

An overview on Bearded Vulture conservation in Europe

The conservation of Bearded Vultures in Europe has a long history and started shortly after the last bird was shot in the Alps in 1913. Here we focus on conservation projects using captive bred birds to bring the species back to mountain ranges all over Europe. Challenges, success, drawbacks, and celebrations happen in all projects and we try to shed light on why these Bearded Vulture conservation projects were successful and what future challenges might be.

Keywords: Bearded Vulture, Conservation, Europe

Sandro López-Ramírez[1]; Raimundo Real[1]; Antonio-Román Muñoz[1]

1 - Universidad de Málaga

Is southern Europe environmentally favourable for the long-term establishment of Rüppell's Vulture (*Gyps rueppellii*)?

The Eurasian Griffon (*Gyps fulvus*) vulture is a large species with a vast range spanning from the Iberian Peninsula in the west to the Himalaya and Central Mongolia in the east. Kazakhstan lies on the northernmost edge of the species' distribution range and according to literary data, in the 20th century it was considered a common species in Kazakhstan. However, there is no recent robust estimation of species abundance and distribution and in recent times researchers found that Griffon Vulture was in the past often mistaken for the Himalayan Griffon Vulture, resulting in the need to question everything known about the species in Kazakhstan. Hence, the aim of the current study was to review published data on the Eurasian Griffon Vulture in Kazakhstan as a first step. As a second step, we aimed to validate field data by visiting colonies and establishing species status and abundance in Kazakhstan. The only confirmed breeding colony of the species in the country is in the Karatau mountains where we focused our efforts. Cases of Griffon Vulture found nesting in other regions are rare or absent.

We counted the number of occupied nests in two different years – 2010 and 2022 — and we registered more than a 90% decrease in the number of active nests. In 2010, 78 active nests were found opposed to only seven found in 2022.

The reasons for the rapid decline in the number of Griffon Vulture are poorly understood. Official data from the Kazakhstan government authorities confirms that non-steroidal anti-inflammatory drugs (NSAIDs) containing diclofenac and ketoprofen are used in the country. Meanwhile, despite the critical drop in numbers, the Griffon Vulture is still not a protected species in Kazakhstan. We recommend urgent measures to understand the scale of the reported threats and the implementation of conservation actions.

Keywords: Climate change, Gyps rueppellii, Species distribution models, Western Palearctic

Filipa Loureiro[1,2]; Filipe Silva[1,2,3]; Roberto Sargo[1,2,3]

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Blood chemistry reference intervals for Griffon Vultures (*Gyps fulvus*)

Plasma or serum levels of some biochemical parameters can provide relevant information about animal health status, being an important tool for establishing a diagnosis and monitoring treatment. Reference values of the baseline blood parameters are extremely useful for clinical practice, namely for newly admitted vultures in wildlife rehabilitation centers and for assessing the health status of individuals from captive breeding programs.

The aim of this study was to establish reference ranges of biochemical indices in Griffon Vultures in Portugal. Reference intervals were calculated following American Society of Veterinary Pathologists guidelines. Results from blood samples collected between 2008 and 2022 were analyzed. All birds were admitted at CRAS-HVUTAD after being recovered from the wild. Only vultures considered healthy, based on physical examination, were considered. Neither age nor gender were differentiated. As a routine procedure, a blood sample was collected from the basilic or metatarsal vein into a lithium-heparin collection tube, and a general biochemical profile was performed, including albumin, total protein, aspartate-aminotransferase, calcium, phosphorus, urea, uric acid, sodium, potassium and chloride.

We consider the calculated reference intervals extremely useful in clinical practice, contributing for a better diagnostic accuracy in wildlife rehabilitation centers. Further analysis is recommended with a bigger sample and more parameters under study, including eventual age-related differences.

Keywords: Gyps fulvus, Blood biochemistry

Filipa Loureiro[1]; Roberto Sargo[1]; Filipe Silva[1,2,3]

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Reference intervals for serum proteins electrophoresis in Eurasian Griffon Vultures (*Gyps fulvus*)

The Eurasian Griffon Vulture has a large distribution and is classified as Least Concern in the Red List. Although the populations trends show that their numbers are increasing, especially in Europe, there is concern about its decline in Northern Africa and Israel. Being the vulture species that is more often admitted to Portuguese Wildlife Rehabilitation Centers, diagnosis and monitoring of this species pathologies are required in a daily basis.

Serum protein electrophoresis is considered an important tool in the accession of the health status of avian species. Its potential to differentiate acute from chronic disease can be extremely valuable in wildlife medicine where usually there's no previous clinical history of individuals. The lack of reference interval (RI) values make extrapolation from other species the mainstay in wildlife rehabilitation.

The ASVCP reference interval guidelines were used to establish reference values for serum protein capillary electrophoresis of the Eurasian Griffon Vulture. A retrospective study retrieved proteinograms values from the individual charts of healthy animals admitted to a Portuguese Wildlife Rehabilitation Center. Health status was determined based on clinical history, physical exam, and haematological and biochemical parameters. 22 proteinograms where retrieved. Values for total protein and albumin, alfa 1, alfa 2, beta and gamma fractions were recorded, and the albumin/globulin ratio calculated. Reference Value Advisor Macro for Excel® was then used to calculate RI. Total protein (1.705-4.519 g/dL), albumin (0.943-2.734 g/dL), alfa2 (0.086-1.172 g/dL), beta (1.7-4.5 g/dL) and gamma (0.019-1.454 g/dL) fractions were calculated using a Robust Box-Cox transformation whereas alfa1 (0.027-0.399 g/dL) RI was calculated using the robust method.

The calculated RI can be used as a reference by clinicians working with Wild Eurasian Griffon Vultures, in Portugal. More studies are needed to ascertain if age and gender can influence the calculated RI and to confirm the RI.

Keywords: *Gyps fulvus*, Serum protein electrophoresis, reference values

Mary Malasa[1]; Kelvin Mkandawire[1]; Chinga Lufwino[1]; Kariuki Ndang'ang'a[2]; Chaona Phiri[1]

1 - BirdWatch Zambia; 2 - BirdLife International

The Vulture Safe Zone Initiative - creating safe havens for endangered vultures; successes and lessons learnt in Zambia

Vulture Safe Zones (VSZs) have emerged as a pivotal conservation strategy within the Multi-Species Action Plan to safeguard African-Eurasian Vultures (Vulture MsAP). These areas are carefully designated areas where concentrated efforts are made to eliminate or significantly reduce threats faced by vultures, including poisoning, persecution, and deforestation. By promoting vulture-friendly practices and ensuring support from key stakeholders such as land managers/owners, and local communities, VSZs create havens that allow these remarkable birds to thrive.

One of the key insights to be highlighted is the indispensable role played by collaboration and community involvement. BirdWatch Zambia has worked towards fostering partnerships with land managers/owners, and local communities, recognizing that collective action is key to save endangered species.

Although Zambia took the lead as the first country among the Range States in Africa to embrace the Vulture Safe Zone concept, inspired by successful initiatives in Asia, the journey is far from complete. This ongoing initiative presents a continuous learning process, with emerging lessons and challenges. During the talk, we will have the opportunity to delve into the shared experiences and valuable lessons gained throughout this remarkable journey.

The discussion will encompass the obstacles faced during the establishment and maintenance of Vulture Safe Zones (VSZs). By delving into these challenges, we can identify areas for growth and improvement in vulture conservation efforts. Understanding these hurdles will help shape strategies and provide insights into creating sustainable and effective VSZs, enabling the continued protection and conservation efforts of vulture populations in Zambia and beyond.

John Mallord[1]; Krishna Bhusal[2]; Ankit Joshi[2]; Deu Rana[2]; Ishwari Chaudhary[2]; Deelip Thakur[2]; Toby Galligan[1]; Rhys Green[3]

1 - Royal Society for the Protection of Birds; 2 - Bird Conservation Nepal; 3 - University of Cambridge / RSPB

High annual survival rates and breeding success aid continued recovery of the Critically Endangered White-rumped Vulture *Gyps bengalensis* population in Nepal

Populations of Gyps vultures underwent catastrophic declines in South Asia from the mid-1990s onwards, caused by unintentional poisoning by the non-steroidal anti-inflammatory drug (NSAID) diclofenac. Vultures were poisoned after consuming the carcasses of domesticated ungulates that had been treated with the drug shortly before death. One species, White-rumped Vulture G. bengalensis, declined by 99.9% in India between 1992 and 2007. As a result of these declines, three species of Gyps vultures were classified as Critically Endangered, with a high probability of extinction if remedial action was not taken. The manufacture, distribution and use of diclofenac for veterinary use was banned in 2006, since when the decline of vulture populations has halted, including in Nepal where, between 2013 and 2018, numbers increased at the maximum possible rate. However, populations are still extremely low compared to pre-decline levels. Here, we update the population status of White-rumped Vultures in Nepal with results from the most recent road transect surveys. Also, using survival data obtained from the monitoring of wild GPS-tagged vultures, and data on productivity from annual monitoring of nesting colonies throughout Nepal, we use a simple matrix model to estimate the intrinsic rate of population increase of this vulture population. We compare this with the estimated annual rate of increase predicted by the modelling of counts of vultures on the road transect surveys, and show that the increase in the number of vultures encountered on these surveys can be explained solely by the combination of high survival rates and productivity, thus vindicating the Vulture Safe Zone approach to eradicate diclofenac from the environment. Finally, we compare the situation in Nepal with the latest results of road transect surveys in India, and discuss potential reasons for the differences in population trends.

Keywords: Population trends

Michelle Marcano-Delgado[1]; Juan Ramírez[1]; Adrián Martín-Taboada[1]; Raimundo Real[1]; Antonio-Román Muñoz[1]

1 - Universidad de Málaga

Spatio-temporal movements and home range of Rüppell Vultures in Europe

Rüppell's Vulture (*Gyps rueppelli*) is an African species whose distribution extends across the Sahel region and through the savanna regions of East Africa. It has undergone a severe population decline in most of its range, mainly in West Africa, and is currently listed as Critically Endangered by the IUCN. Despite not being a migrant, it has been recurrently observed in recent years outside its breeding area in Northern Africa and Southern Europe, becoming a regular visitor to the Mediterranean region. The arrival of Rüppell's Vultures to the Iberian Peninsula is associated with migratory Griffon Vultures (*Gyps fulvus*) wintering in West Africa and returning to Europe during spring. Once the African species is in Europe, little is known about its movements and potential establishment, although both species continue subsequently associated. To fill this knowledge gap, we tagged 3 Rüppell's vultures (two adults, one male and one female, and an immature) with GPS transmitters, to better understand and characterize their movements in Europe. We have estimated the size of their home ranges and calculated their fidelity to certain breeding colonies. We have also performed visualizations of their association and interactions with Griffon Vultures, detecting pieces of evidence of reproductive behaviour. Differences in home-range size between age classes were detected, demonstrating that the two adults show fidelity to certain areas with relatively short movements around them, while the immature perform broadscale movements. Characterizing the movements and potential establishment patterns can prove fundamental in understanding the ecology of the species in what seems to be the start of its establishment in Europe.

Keywords: GPS tracking, spatial analysis, distribution, Home range

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1 - JMM Consultant; 2 - Environmental and Water Agency. Ministry of Sustainability, Environment, and Blue Economy. Andalusian Regional Government; 3 - General Directorate of Forest Policy and Biodiversity. Ministry of Sustainability, Environment, and Blue Economy. Andalusian Regional Government.; 4 - Flekos S.L. Asesores ambientales

Pair composition and reproductive success as indicators of the impact of poisoning and population health in a Cinereous Vulture (*Aegypius monachus*) population in Southwestern Spain

In a south-western Spain population of Cinereous Vulture (*Aegypius monachus*), the evolution of their reproductive parameters, including the rate of pairs with a subadult member and the reproductive success both in general and for each type of pair, was analysed for almost two decades (2002-2020). The data were compared with the results of the Strategy Against Illegal Use of Poison of the Regional Government of Andalusia, implemented at the beginning of the study period, coinciding with a phase of the steep decline of the study population due to a high incidence of illegal use of poison in the environment.

The implementation of the anti-poisoning strategy resulted in a 14 % reduction in poisoning episodes in the area of influence of the colony, which corresponded to an annual increase of 3.1 % in the number of breeding pairs.

During this period, the breeding success of the colony remained relatively stable, with a tendency to increase in recent years, with a gradual reduction in the proportion of mixed pairs observed throughout this time, more accentuated from 2010 onwards, which is related to the effectiveness of the Strategy. It was found that the reproductive success of pairs consisting of two adults was significantly higher than that of pairs with at least one subadult throughout the period.

The results indicate that the proportion of pairs with at least one sub-adult individual is an indicator of the health status of a Cinereous Vulture population. This parameter can be used as an early warning of mortality events that may be affecting the population, even if this condition is not reflected in other population parameters.

It is proposed that the monitoring of the colonies should establish the type of breeding pairs in at least 10% of the colonies in order to monitor the evolution of this parameter.

Keywords: Pair composition, Cinereous Vulture, Poisoning, Reproductive success, Indicators

Félix Martínez[1]

1 - Natural park biologist

Movements of adult Eurasian Griffon Vulture (*Gyps fulvus*) during the reproductive season

Movements of adult Eurasian Griffon Vultures *Gyps fulvus* during the reproductive season

Félix Martínez, Juan Oltra, Óscar Frías, José L. González del Barrio, Juan Manuel Pérez- García, Martina Carrete, Guillermo Blanco.

During 2021 and 2022, 20 adult Griffon Vultures were captured in batted cages in the vicinity of their colonies in the province of Segovia (central- northern Spain) and fitted with GPS-GSM transmitters. Information on individual movements (from June 2021 to the present) was complemented by monitoring their breeding status in each season.

All birds were located within a maximum radius of 50 km from the tagging site. Of the 36 breeding events monitored in the three breeding seasons (2021- 2023), 7 (19,4%) were attributed to non-breeding individuals, 16 (44,4%) to breeding failures (13 with eggs and 3 with chicks) and 13 (36,1%) to successful breeding events, wherein pairs successfully fledged a chick.

In the least 8 cases, tagged birds had flown away from the colony during the breeding season, either because they failed to breed (n=1), failed during incubation or while rearing the chick (n=4) or because the chick was already in its final stage of development (n=3). One case in particular was a male that left for 40 days at more than 1500 km away while the female was still rearing the chick.

In addition to providing insights into the movements during the breeding season, the monitoring of these vultures has yielded valuable information regarding the factors influencing their non-natural mortality, such as collisions with power lines.

Keywords: movements, Griffon Vulture, breeding season

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Daily incidence of lead ammunition ingestion in Griffon Vulture in Spain: comparing estimations from regurgitated pellets and blood analysis

Birds of prey can be exposed to lead (Pb) by ingesting shotgun pellets or bullet fragments that are embedded in the tissues of their prey. Although birds of prey can eliminate Pb ammunition by regurgitating it in pellets, the extremely acidic gastric fluid of these species favours its absorption during the digestion process. The objective of this study was to quantify the frequency of Pb ammunition ingestion in Griffon Vultures (*Gyps fulvus*) to establish whether the blood Pb levels observed in Spain can be fully explained by the ingestion of Pb ammunition. Fresh pellets (n=622) were collected between 2020-2022 at roosting sites. Pellets were X-rayed and radiopaque particles were examined and analysed by ICP-MS. The main prey taxa present in each pellet were identified by hair characteristics. X-ray examination revealed the presence of particles of Pb (8.5% of pellets), Cu (1.1%), Fe (0.3%) and Bi (0.3%): 9.6% of pellets contained ammunition, that is, Pb and/or Cu. Prevalence of ammunition ingestion was significantly higher in the season in which large game hunting occurred (11.7%, n=385) than in the rest of the year (6.3%, n=237). The presence of ammunition particles was higher in pellets with game animal remains (17.6%) than in those with livestock remains (3.3%). Assuming an average pellet regurgitation time of 3 days and a time of 14 days after ingestion of ammunition during which blood Pb concentration is elevated (>20 g/dL), we estimate a similar daily incidence (3.2-3.3%) from the prevalence obtained from blood Pb analysis in live free-ranging vultures (44.5%) and from non-invasive monitoring of regurgitated pellets (9.6%). The high rate of ammunition ingestion associated with the consumption of game animals may well explain the high prevalence of elevated blood Pb levels >20 µg/dL, given that results estimated from blood analysis and non-invasive pellet monitoring were similar.

Keywords: Poisoning, Contaminants, Metals, Conservation, Hunting, Ecotoxicology

Milene Matos[1]; José Pedro Tavares[1]

1 - Vulture Conservation Foundation

LIFE Aegypius Return: Consolidating the return of the Critically Endangered Cinereous Vulture (*Aegypius monachus*) to Portugal and Western Spain

Formerly widespread in Iberia, the Cinereous Vulture (*Aegypius monachus*) became increasingly scarce in the region over the 20th century mostly due to habitat loss, wildlife poisoning and direct persecution. In the 1970s the breeding population went extinct in Portugal, and only around 200 pairs remained in Spain. Following the implementation of legal protection and targeted conservation measures, the species started recovering in Spain and naturally recolonised Portugal with the first breeding pair detected in 2010 in the Tejo International Natural Park. Since then, more pairs began settling across different regions of Portugal and four colonies are currently known.

The recovery process has been steady, although slow and limited, and the need of urgent action to ensure the definitive return of the species to Portugal and Western Spain led to the approval of the LIFE Aegypius Return project.

Until 2027, the project aims to increase the breeding population in Portugal to at least 80 pairs in five colonies, improve the breeding success, encourage the connectivity between colonies and downgrade the national conservation status from Critically Endangered to Endangered.

Concrete conservation actions will include the reduction of disturbance around the nests, fire prevention, the installation and reparation of nesting platforms, the improvement of food availability, anti-poisoning fights, and population reinforcement via soft release strategies. Furthermore, a thorough collaboration and capacitation plan will be put in place, promoting joint work with all relevant stakeholders – e.g. hunters, farmers, national authorities, conservationists – to improve ecological conditions for the species and to detect and fight wildlife crime and illegal poisoning, which is vultures' biggest threat worldwide.

The success of LIFE Aegypius Return relies on the extensive collaboration of nine partners and the active involvement of such stakeholders. The project already got off to a good start, with a promising breeding season closely monitored in 2023.

LIFE Aegypius Return has a 3.7 million budget and is co-financed by the European Union's LIFE Programme. The project is led by the Vulture Conservation Foundation in collaboration with Palombar, Herdade da Contenda, SPEA, LPN, ATNatureza, Fundación Naturaleza y Hombre, GNR and ANPC.

Fadzai Matsvimbo[1]

1 - BirdLife International

Belief-based use of vultures in Africa: Finding the balance between conservation and culture

African Vultures are declining rapidly with 7 of 11 species globally Endangered or Critically Endangered. According to the CMS-Multi-species action for vultures, subsequent reviews, and CITES Documents, killing to feed the trade in body parts for belief-based use is one of the drivers of vulture deaths in Africa. The practice of using vulture parts in belief-based use is in some countries somewhat understood, however there is still the need to improve the knowledge in other areas. Many and varied reasons are sited as to why vulture parts are used in traditional medicine. These include ability to foretell the future, provide clairvoyant powers and getting in touch with ancestors. Foretelling the future is often be associated with the desire to control specific outcomes such as winning 'big' in gambling attempts.

BirdLife International through its partners has gone into a deep dive over the last few years to gain more knowledge on the extent to which vultures are traded and used in belief-based use in parts of West, Southern Africa and more recently in East Africa. Improvement in knowledge has been done by carrying out market surveys in target urban markets, building customer profiles of seekers of vulture-based traditional medicine, engaging in deep and meaningful exchanges with healers and working with law enforcement units to access data related to trade in vulture parts. Solutions proffered include exploration of non-animal alternatives, reducing demand from customers by raising awareness on the impact of their decisions and assisting traditional healers to improve income streams from other sources outside their trade. The amassing of evidence related to use of vulture parts, particularly at local level over the last few years has opened possibilities of finding lasting solutions that can be rolled across the African landscape.

Keywords: belief-based use

Brian Mcgowan[1]

1 - SCIENTIAS Ireland Limited

Global perspective on insulation and protection strategy to reduce risk of electrocution on distribution power line infrastructure

Bio: Brian McGowan formed Scientias Ireland in June 2023 to educate and support wildlife protection in power infrastructure. He has 25 years global experience working in new product development and solution design in this field. He is considered and expert in the fields or insulation co-ordination, HV materials science, lightning arresters and wildlife protection using both insulation products and bird flight diverters.

The presentation will offer an independent global perspective on strategies to reduce raptor mortality on LV/MV infrastructure with focus on electrocution prevention.

The presentation will discuss:

a) the importance of open communication and collaboration between utilities and NgOs in developing holistic solutions vs incidence response. This section will give an insight into the factors that drive utility investment in this area; Asset protection, outage prevention and wildfire risk mitigation.

b) Best practice in green field grid/line design with wildlife mitigation in mind

c) Raptor electrocution mitigation options for existing lines (retrofit) which will discuss product design, material specifications and installation techniques.

d) Case study from Middle East targeting protection of storks and raptors which resulted in an 85% reduction in avian electrocution on high risk lines.

e) What WIN/WIN success looks like for protected wildlife, the Utility and wildlife NgO.

Based on my experience, the most successful outcomes arise when power utilities, wildlife organisations and equipment manufacturers align and work together with a aligned goals.

Wildlife protection, Asset protection, Outage & fire prevention and solutions that are easy and safe to install.

Keywords: Wildlife Protection, insulation, electrocution, risk mitigation

Poster presentation

Kyriaki Michael[1]

1 - Terra Cypria

Use of illegal poison baits in Cyprus: motives, beliefs and level of awareness of local residents within the home range of the Griffon Vulture

Successful conservation of the vulnerable Griffon Vulture *Gyps fulvus* population in Cyprus is heavily threatened by the use of illegal poison baits. Poisonings have also contributed to the local extinction of Cinereous Vultures *Aegypius monachus*, while they pose a threat to hunting dogs, livestock guardian dogs and pets, as well as to human health. To better understand the awareness levels of locals regarding the illegal placement of poison baits, a two-phase study was conducted under the framework of the project 'LIFE with Vultures CY' (LIFE18 NAT/CY/001018). The study aimed to explore the motives behind poison bait use, beliefs surrounding this illegal practice, awareness of the consequences to wildlife, human health and domestic animals, as well as experiences and knowledge of locals regarding Griffon Vultures and their threats. The first phase of the study was carried out in 2020, where semi-structured, face-to-face interviews and phone interviews were conducted in villages that fall within the current home range of Griffon Vultures. Data were collected from 52 communities, completing a total of 824 questionnaires from hunters, farmers, villagers and livestock breeders. Results suggest that the motives behind the use of poisoned baits are rooted in human-human and human-wildlife conflicts that mainly arise from hunting and livestock-breeding activities. Discussions with locals also included possible alternative solutions, which could discourage the use of poison baits without compromising hunting and livestock-breeding activities. Several project actions focused on raising awareness in villages about the risks of poison bait use and the threatened status of the Griffon Vulture. To measure changes in awareness level after project actions, a second phase of interviews followed in 2023. Results will identify gaps, enabling more focused community actions and support in the long-term.

Keywords: Griffon Vulture, illegal poison baits, motives, awareness levels, local community

Davide Montanari[1]; Juan Pablo Díaz Fernández[1]

1 - GREFA (Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat), c/ Monte del Pilar s/n, 28220, Majadahonda (Madrid) Spain

Ranging behavior and resource selection of breeding Cinereous Vultures in a recently restored colony

Vultures now inhabit areas where human activities impact their behavior and distribution and may threaten their populations in the long term. Therefore a detailed understanding of vulture ranging behavior is crucial, especially in light of colony restoration. This study uses GPS satellite telemetry data of Cinereous Vultures (*Aegypius monachus*) breeding in a recently restored colony in the Sierra de la Demanda, Spain. The analyses are to assess, first, the space use patterns of breeding Cinereous Vultures. For this reason we calculated the mean home range (Kernel Density Estimation 90%) and mean core area (KDE 50%) of 10 mature Cinereous Vultures during the breeding season. Then, we aimed to investigate how the five anthropogenic food sources in the area of the colony affect the ranging behavior of the selected vultures. A finer-scale analysis (number of individual locations in a 100m radius from the food source site) focused on the individual usage of the two feeding sites established by the reintroduction team in the core area of the colony. A larger-scale (1km radius) was considered to investigate the usage of the three closest vulture restaurants to the reintroduction site. The breeding season time interval was divided into the four main phases: (1) egg incubation, (2) from hatching to 80 day, (3) from 80 day to first flight, (4) from first flight to one month after. The non-breeding season, winter, was excluded from the analyses to rule out larger dispersal movement and to focus only on the ranging behavior in the colony surroundings.

Keywords: Cinereous Vulture, ranging behavior, breeding season, anthropogenic food resources

Davide Montanari[1]; Ana María Saez Fernández[1]; Lorena Muñoz Juste[1]; Iván Peragón Arias[1]; Émilie Sophie Delapoulle[1]; Manuel Galán Crespo[1]; Ernesto Álvarez Xusto[1]

1 - GREFA (Grupo de Rehabilitación de la Fauna Autóctona y su Hábitat), c/ Monte del Pilar s/n, 28220, Majadahonda (Madrid) Spain

Restoring and connecting Cinereous Vulture (*Aegypius monachus*) colonies to reestablish the former European range of distribution of the species

After the quasi-extinction of Cinereous Vultures in Europe during the last two centuries, reintroduction projects seek to restore the decimated population. The survival and return of the species relies not only on the area suitability for the species ecology, but also on its location, which has to prompt safe corridors for vultures to move between colonies, increase gene flow and, hence, reduce extinction risks. In 2007, GREFA designed the Monachus Project to restore Cinereous Vulture colonies connecting areas already occupied by the species. Nowadays, the Monachus Project operates in five reintroduction sites: three in Spain, one in Bulgaria, and one in Italy. In the Sierra de Boumort (Spain), where Cinereous Vultures were locally extinct, the area surrounding the reintroduction site now hosts a colony of about 70 individuals and between 15 and 20 breeding pairs. The reintroduction of vultures stopped in 2021, because the colony reached a favorable self-sustainable status. In the Sierra de la Demanda (Spain), where the species was locally extinct, there currently is a colony of about 85 Cinereous Vultures with 24 territorial couples, established in only seven years. The last reintroduction program started in 2022 in Els Ports National Park (Spain), which is a pivotal location in a corridor between existing colonies. Internationally, GREFA is collaborating with BirdLife Bulgaria and Rewilding Europe to restore a colony of the species in the Eastern Rhodopes (Bulgaria). In addition, GREFA partnered with the regional administration and the Italian responsible Ministry to restore a Cinereous Vulture colony in Sardinia, starting in 2024. Over the years, GREFA's results are backing a reintroduction protocol for Cinereous Vultures that is a successful model. The model is now employed in a number of European locations to restore Cinereous Vulture colonies, reestablish safe corridors of movements and, thus, the former distribution range of the species.

Keywords: Cinereous Vulture, rewilding, corridors, colony restoration, reintroduction model

Poster presentation

Antonio Monteiro[1]; Luis Reino[1]

1 - Departamento de Biología Animal, Ecología, Parasitología, Edafología y Química Agrícola - Universidad de Salamanca BIOPOLIS / CIBIO - Research Center in Biodiversity and Genetic Resources InBIO Associate Laboratory - University of Porto

Rewilding and trophic availability scenarios for breeding vulture populations in Portuguese mountainous areas

Three species of vultures have stable breeding populations in Portugal: the Egyptian Vulture (*Neophron percnopterus*), the Cinereous Vulture (*Aegypius monachus*), the Eurasian Griffon Vulture (*Gyps fulvus*). Their presence and breeding numbers have been directly related with animal husbandry for centuries (Donázar 1993).

Presently, important changes to this longstanding pattern are happening, and are expected to intensify due to new socioeconomic and ecological trends in the Iberian countryside (Cortés-Avizanda et al., 2015; Navarro, L.M., Pereira, H.M. date, 2012). Examples include: the reduction in extensive livestock numbers and mortality rate (due to veterinarian effectiveness) (RA/INE 2019, Carmo et al, 2022); the intensification of carcass removal and destruction due to heath protection restrictions; and the increase in wild ungulates due to rural abandonment and rewilding activity in mountainous areas (Martín-Díaz, P. et al., 2020; Delgado-González, A., 2022).

This study describes recent trends in livestock and wild ungulates in Portugal, and analyses different scenarios of trophic availability for the forthcoming years, depending on the magnitude of rewilding processes taking place in Portuguese mountainous areas. We discuss its consequences on vulture conservation policies.

Keywords: rewilding, vultures

Rubén Moreno-Opo[1]

1 - Ministry for the Ecological Transition and the Demografic Challenge

Future prospects to reduce negative impacts of power lines

Power lines cover approximately one million kilometers in Spain. This extensive network of infrastructures has negative impacts on biodiversity in terms of fragmentation and the barrier effect on wild species. The most widely studied effect is the mortality caused by collisions and electrocution at the pylons of power lines, estimated at more than 33,000 birds of prey per year, to which must be added that of other groups of birds of prey. birds, mainly soaring birds, and bats.

Aware of the challenges involved in reconciling energy and environmental aspects in the management of power lines, for several decades environmental regulations have been published aimed at reducing their negative impacts on birds, both nationally (DR 1432/2008) and at the regional level. And more recently, industrial legislation has also incorporated the need to guarantee the safety of electrical installations from the point of view of compliance with technical requirements to avoid impacts on birds (RD 542/2020). This framework of practical action is complemented by the regulations on general protection of wildlife (Law 42/2007 and Penal Code) and environmental responsibility (Law 26/2007). However, and despite the heavy investment made by public administrations (>100 M€ for the period 2008-2025), electricity companies and even by non-governmental entities, the current situation is far from satisfactory and vultures and other large birds are still being killed which compromise their conservation status.

It is necessary to propose new approaches in mitigating the negative impacts of power lines on biodiversity, with the purpose of improving sectoral regulations and for the application of new line correction techniques that allow economic investment to be permanent over time. The aspects related to the assumption of competences in the management of the problem and the use of the opportunities offered by these infrastructures to favor different aspects related to biodiversity are also interesting.

Keywords: electrocution, powerlines, legislation

Antonio-Román Muñoz[1]; Juan Ramírez[1]; Marina Guerrero[1]; Pako Zufiaur[1]

1 - Universidad de Málaga

First confirmed data of Rüppell´s Vulture breeding in Senegal: phenology and population estimation

Although the Rüppell's Vulture (RV) distribution is said to range from the Atlantic coast of Senegambia in the West to the Horn of Africa in the East, and Tanzania to the South, the reproduction of this species in Senegal has not been confirmed yet in scientific literature. Despite being a "Critically Endangered" species whose population has dramatically decreased in the last decades, RV remains the least known vulture species in Africa. Hence, to fill the knowledge of its current distribution and population size become essential. During January 2022 and April-May 2023, we carried out a fieldwork campaign in the north of Senegal focused on searching for breeding evidence. We found nine occupied nests of RV, all in Acacia and baobab trees. Those found in January were with eggs or recently hatched chicks and those in April-May were with grown-up ones. On the 4th of May 2023, we could spot a just-fledged juvenile on a carcass. With all this evidence we are able to draft a phenology of the breeding season for RV´s in West Africa during our study period. Twelve carcasses were detected in January 2022, involving 126 RVs. Of these, 100 were aged as adults and 26 as immatures. This biased proportion coincides with other authors when described that breeding areas lack immature birds. According to the number of active nests recorded, the number of adult RVs detected, the reduced proportion of area surveyed (mostly along the main roads) and the uniformity of the whole area (regarding habitat and food availability), we estimate a breeding population size of between tens and hundreds of pairs in Senegal. Further fieldwork is essential to know the situation of RV in West Africa, where the only certainty seems to be that the population is declining.

Keywords: Gyps rueppelli, Senegal, Breeding, Distribution

Antonio-Román Muñoz[1]; Juan Ramírez[1]; Sandro López-Ramírez[1]; Michelle Marcano-Delgado[1]; Raimundo Real[1]

1 - Universidad de Málaga

From the first observations to the recent establishment: the paradox of a sub-Saharan species colonizing the western Palearctic

Ongoing climate change is causing latitudinal shifts in many species to reach more favourable climatic conditions. These changes are of particular relevance in southern Europe, where a short-distance expansion of African species' range toward the north represents a major step in biogeographical terms, as a new continent would be reached and colonised. In this way, species that were never in contact suddenly interacts with each other, generating changes in communities. This is currently occurring with Griffon and Rüppell's vultures in the Iberian Peninsula, where individuals of the African species are beginning to establish themselves on a stable basis in breeding colonies of Griffon Vultures. Until now, there has been no evidence that Rüppell's Vulture has been able to breed in Europe, despite some observed breeding attempts that did not result in successful reproduction. In 1999, an adult Rüppell's Vulture was observed in Portugal in a possible nest, although successful breeding was not confirmed. The next signs of reproduction were detected in 2020 in southern Spain, when a female Rüppell's Vulture was recorded mating with a male Griffon Vulture in Cádiz province, and a different female was observed carrying nesting material in Málaga province. Throughout 2021 and 2022, breeding attempts have consistently occurred in the breeding colony of Málaga, but close monitoring of the individuals, tagged with GPS transmitters confirmed that mating did not result in egg-laying. During the year 2023, the situation has changed and, in this communication, we will report the first confirmed case of Rüppell's Vulture breeding in Europe. Paradoxically, as the species begins to colonize a new biogeographic realm in the Palearctic, its rapid decline caused it to be reappraised to the IUCN Critically Endangered category. We will detail the case and discuss the potential implications for the conservation of the species.

Keywords: Colonization, *Gyps rueppelli*, Western Palearctic

Campbell Murn[1]; Andre Botha[2]

1 - Hawk Conservancy Trust; 2 - Endangered Wildlife Trust

Heading south, but to where? A shifting distribution of breeding Lappet-faced Vultures (*Torgos tracheliotos*) is impacted by fire and elephants in Kruger National Park, South Africa

The Endangered Lappet-faced Vulture (*Torgos tracheliotos*) is little-studied and published data on the species are few. In Kruger National Park (KNP) in northeast South Africa there is a globally important population of 40-50 Lappet-faced Vulture nests that has been monitored from 2008 to determine aspects of breeding biology and spatial distribution. Across 89 pair/years, mean productivity of 67 breeding attempts was 0.73 chicks per pair and did not differ significantly across the park or between years. Mean nearest neighbour distance in preferred nesting habitat was 4.2km (±SD 2.22 km) and 6.2 km overall. Inter-nest distances in preferred habitat ranged from 1.4 km to 8 km, but increased to >20km in other areas of the park. When compared to nests recorded between 1982 and 1994 (Era A), the mean latitude of Lappet-faced Vulture nests between 2008 and 2015 (Era B) was approximately 1.1 degrees (122 km) further south. Lappet-faced Vulture nests were usurped mainly by African White-backed Vultures *Gyps africanus* (13%, n = 7). Elephants (Loxodonta africana) and fire are integral features of the KNP landscape and both impact vulture nest trees. Of 54 nest trees monitored intensively between 2008 and 2015, 15 disappeared: two were destroyed by fire and 13 (24%) were pushed over by elephants. Proximity to permanent water (dams/boreholes, perennial or large ephemeral rivers) did not affect probability of elephant impact and Lappet-faced Vulture nest trees specifically were often the only tree pushed over by elephants in an area.

Keywords: nest trees, threats, breeding vultures, conservation

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Highly Pathogenic Avian Influenza A (H5N1) infection in Bearded Vultures in Spain, 2022

Since 2020, the reported cases of the highly pathogenic avian influenza (HPAI) A (H5N1) virus of clade 2.3.4.4b in birds has increased exponentially. In Europe and the United States, over 15800 cases have been reported, with more than 700 cases involving different vulture species. In addition, high mortality associated with HPAI H5N1 have also been notified in other vulture species in South America and Africa. In the present study, we report mortality in Bearded Vultures (*Gypaetus barbatus*) associated with HPAI A H5N1 clade 2.3.4.4b. On May 11, 2022, a deceased free-ranging juvenile female Bearded Vulture was found in its nest in southwestern Spain. On May 26, a female adult Bearded Vulture, housed at the Cordoba Zoo Conservation Center, located 170 km away from the above case, showed clinical signs including ruffled feathers, dyspnea, impaired ambulation, jerky movements, depression, lethargy and weakness. Complete necropsies were performed and tissue samples were collected for histopathological, immunohistochemical and molecular analyses. Both animals presented yellowish diarrhea, and gross remarkable lesions included generalized congestion, multifocal lung hemorrhages and necrotizing hepatitis. Microscopic examination revealed moderate mononuclear inflammatory infiltrate and necrosis in brain, lungs, heart, liver, spleen and pancreas, alongside marked gliosis and moderate lymphoid depletion in the spleen. Congestion, hemorrhages and edema causing vascular lesions were also observed, especially in the lung and brain. HPAI H5N1 RNA was identified in brain, feathers and oropharyngeal and cloacal swabs using real-time RT-PCR, while immunohistochemistry confirmed viral presence in brain, heart and pancreas. Phylogenetic analysis revealed that the complete genome sequences of the two viruses cluster into two separate groups with other 2.3.4.4b HPAI H5N1 viruses isolated in Spain during the same period. Our results highlight the susceptibility of Bearded Vultures to HPAI H5N1 and contribute to the knowledge of the epidemiology of this virus, especially regarding its host range.

Keywords: Highly Patogenic Avian Influenza H5N1, Epidemiology, Wild birds, Bearded vulture

Poster presentation

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Delving into the study of the survival of a donor population in the king of bones

In wild populations, survival is one of the demographic parameters governing population dynamics. Survival is integrated into population analysis, among other parameters such as dispersal or colonization. Population analysis permeates disciplines such as conservation biology and wildlife management. To calculate the probability of survival of birds, capture-recapture models are frequently used, with the Cormack-Jolly-Seber (CJS) being the most commonly used methodology. The Bearded Vulture (*Gypaetus barbatus*) is an endangered species specialising in a strictly osteophagous diet. We wanted to calculate the survival of this vulture in the Aragonese Pyrenees, where the main population of the species is located. For this purpose we have used a database covering a period of 33 years (1987-2020). Our CJS models estimated a survival rate of 0.91±0.10 in juveniles, 0.94±0.05 in subadults and 0.88± 0.11 in adults. The trend in the evolution of the survival of the species in the Aragonese Pyrenees has been positive. Our study provides updated information on the status of a demographic parameter of great importance for the species, and allows us to identify the most vulnerable age classes and plan conservation actions to improve the situation of the species in a territory that donates specimens for reintroduction projects. The calculated survival values suggest that the monitoring of individuals at supplementary feeding points means that not all age classes are monitored equally. Furthermore, given the inherent philopatry of Pyrenean Bearded Vultures, more caution should be exercised when planning these feeding points according to the ethology of the species.

Keywords: Bearded Vulture, *Gypaetus barbatus*, population dynamics, conservation, management

Poster presentation

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Restoring the sky: an Initiative for vulture reintroduction in Romania

Vultures, once abundant across Europe, have faced a decline due to factors such as habitat loss, food scarcity, persecution, and poisoning. However, through reintroduction efforts and species protection measures, European vulture populations are gradually recovering, offering renewed opportunities to witness these majestic birds soaring through the sky.

Vultures play a crucial ecological role as efficient scavengers, maintaining the balance of nature by swiftly disposing of carcasses. Their ability to consume large quantities of flesh and neutralize pathogens through stomach acids contributes to curbing the spread of diseases.

Historically, Romania was home to four vulture species, all of which have become extinct, namely: Egyptian Vulture (*Neophron percnopterus*), Bearded Vulture (*Gypaetus barbatus*), Cinereous Vulture (*Aegypius monachus*), and Griffon Vulture (*Gyps fulvus*).

The main causes for the disappearance of vultures in Romania can be attributed to several factors: habitat loss, decreasing availability of food, persecution and poisoning, hunting, lack of awareness and conservation efforts.

Reversing these trends requires comprehensive conservation strategies, including habitat restoration, addressing food scarcity, combating persecution and poisoning, raising awareness, and promoting community involvement in vulture conservation efforts.

In this phase, our work outlines a comprehensive framework for a vulture reintroduction program in Romania, with the aim of restoring and conserving vulture populations and fostering ecological balance.

The proposed program encompasses five key components: (1) Assessing the feasibility of vulture reintroduction, considering ecological, social, and economic aspects; (2) Developing partnerships with local stakeholders, governmental bodies, and conservation organizations to ensure collaboration and long-term commitment; (3) Implementing captive breeding programs to establish a sustainable vulture population; (4) Releasing the vultures into suitable sites based on ecological necessity, availability of food resources, and minimizing potential conflicts with human activities; and (5) Monitoring and evaluating released individuals to assess their survival, behavior, and integration into the wilderness.

Keywords: vulture, restoration, ecological network, conservation

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Egyptian Vulture conservation at a flyway scale: challenges and opportunities

The Egyptian Vulture (EV) is the most threatened and the only long-distance migrant among European vultures. The Balkan population has decreased by 80% since 1980s with high probability of extinction in the next 25 years. To prevent this, the flyway project "Egyptian Vulture New LIFE" was implemented by 22 partners from 14 countries in the Balkans, Middle East and Africa. It aimed at boosting the population recovery through mitigation of the major threats, active management, substantial increase of stakeholder's engagement and public awareness. As conservation impact, for the first time in the last 30 years, the target population showed signs of stabilization. Population reinforcement was applied to compensate the high mortality of drowning during the first migration. The rate of poisoning decreased due to endorsement of anti-poisoning road maps, establishment of local community networks and canine teams, training of authorities and adoption of efficient methods to mitigate human-carnivore conflict. Processes started to ban veterinary use of NSAIDs and endorse protocols for poisoned carnivore management along the flyway. Mortality due to energy infrastructure was reduced by insulating over 1,600 hazardous poles in breeding grounds, migration bottlenecks and wintering congregation sites. Direct persecution was reduced by closing a large wildlife market, establishment of anti-poaching units in the Middle East, development of conservation strategy and training 300 stakeholders in Africa to combat the belief-based use of vultures and promote plant-based alternatives. Half of the Balkan population benefitted from 11 new vulture restaurants, individual supplementary feeding and nest-guarding. An ambitious environmental-educational programme reached 5,400 pupils in 90 schools. The project's flyway campaigns directly reached over 950,000 people through 150 events and 30 million via media channels. A strongly committed team, evidence-based and best-practice conservation, and wide international networking were the main tools to achieve these impressive results.

Keywords: *Neophron percnopterus*, migratory soaring bird, LIFE project, mitigation of threats, flyway conservation approach

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1 - Center for Protection and Research of Birds

Vulture status and perspective in Montenegro - insights and challenges

Montenegro, a cattle-breeding country with a rich livestock population, was once a thriving habitat for all four vulture species found in Europe. However, the current status of vultures in Montenegro is alarming, with all four species being locally extinct. Poisoning and poaching are being pressing issues that have contributed to their decline, with the critical role of the Center for Protection and Research of Birds (CZIP) in their conservation.

CZIP, through satellite monitoring and data sharing with regional colleagues, has identified vital vulture locations and corridors. This knowledge forms the basis for targeted conservation actions, including habitat protection and the identification of safe foraging areas and potential reintroduction sites.

More comprehensive measures are needed to address the challenges of Poisoning and poaching effectively, with urgent need for collaborative regional initiatives to combat poisoning and include Montenegro in these efforts.

An additional crucial aspect of vulture conservation in Montenegro relates to the proper disposal of animal waste. Current waste management practices do not meet high environmental standards, resulting in potentially harmful food sources for vultures. The abstract proposes the establishment of a vulture supplementary feeding station. This provides vultures with a safe and nutritious food source and presents an opportunity for positive changes in animal waste disposal practices. Through centralized waste management within the feeding station, the risks associated with uncontrolled access to toxic carcasses can be mitigated, reducing the threat of poisoning to vultures.

In conclusion, this abstract highlights the challenges faced by vultures in Montenegro, particularly poisoning and poaching, which have led to their local extinction. Although CZIP's role in vulture conservation in Montenegro is essential, concerted regional efforts and the establishment of a supplementary feeding station are necessary to combat poisoning, ensure adequate food resources, and pave the way for the recovery of vulture populations in Montenegro.

Keywords: movements, supplementary feeding, poisoning, Balkans

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Magnitude and trends of vultures passage through the Strait of Gibraltar

The Strait of Gibraltar is one of the most important corridors for migratory soaring birds of the Western Palearctic. From 1999 to the present, a postnuptial migration monitoring program based on standardized protocols of constant effort has been developed, which is providing valuable information on these winged sentinels, useful for evaluating the real effect of human activity on ecosystems. Throughout this monitoring period, seven species of vultures have been recorded, including species of regular and numerous passage -thousands of individuals each autumn- (Griffon Vulture *Gyps fulvus* -average of 9,870 ind in the last 10 years-, Egyptian Vulture *Neophron percnopterus* -2,850 ind-), regular but scarce passage – dozens of individuals or less- (Ruppell's Vulture *Gyps rueppelli* -35-ind-, Black Vulture *Aegypius monachus* -5 ind-), or species with a more irregular and sporadic passage (Lammergeier *Gypaetus barbatus*, White-backed Vulture *Gyps africanus*, Hooded Vulture *Necrosyrtes monachus*). This movement of vultures through the strait includes the regular migratory movements of breeding populations in Western Europe (Egyptian Vulture), the seasonal migratory movements of juvenile or immature individuals (Griffon Vulture) or movements of young or immature individuals in juvenile dispersal (other species). The trends in the censuses show increases in the passage of all vulture species for the last 25 years, which show the recovery of breeding populations of Western European vultures and an increase in the numbers of African vulture species.

Keywords: Egyptian Vulture, Griffon Vulture, Ruppell´s Vulture, Strait of Gibraltar, Migration

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Soaring through the central Apennines. Where (not) to go

Collision with wind turbines is one of the main threats to Griffon Vultures (*Gyps fulvus*) in the central Apennines, causing 20% of mortality. To mitigate this threat, it is important to understand how Griffon Vulture space use is related to the location of windfarms. To study the possible effect of aerogenerators on Griffon Vulture space use and movements, we estimated utilization-distribution (dynamic Brownian Bridge Movement Model) from 2 years of GPS data from 53 individuals, across 4 seasons based on their reproductive cycle (courtship, incubation, parental care, and post-fledging). Next, we modelled a resource selection function (RSF) with a use-availability design, with height, slope, eastness, northness and distance to turbines as explanatory variables, and used this model to predict the suitability of the whole landscape for each of the four seasons. We found that the utilization of the area expands to the north, east and south from April to December, which also increases the overlap of the utilization with two main wind farms. From the RSF it could be argued that Griffon Vultures select steep, south facing slopes at high elevation, and select areas closer to wind turbines, which was found in other European Griffon Vulture populations as well. Utilization of the areas around wind turbines is higher during the warmer months, while the number of collisions is higher in winter. This discrepancy suggests that during warm months, the vultures might be avoiding turbines horizontally or vertically at a scale smaller than the one we used (200 m). RSF results show that there is further suitable area for Griffon Vulture flight in the whole landscape and away from wind turbines, which is seldom or not yet occupied. However, especially in some seasons, vultures first need to cross both wind farms, so we could expect larger impacts in the future.

Keywords: Mortality, Conservation, Wind turbine collision, Resource selection function, Utilization-distribution, Landscape planning, Vultures

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Nocturnal feeding in a diurnal, large soaring scavenger: behavioural flexibility bears some risks

Griffon Vultures are diurnal, obligate scavengers. However, nocturnal feeding could occur, likely as a response to intraspecific competition, as the risk of being injured by other vultures should decrease when trophic niche broadens towards nocturnal hours. We report herewith the first nocturnal feeding occurrences in the central Apennines, Italy. These were recorded at a feeding station (N=9; monitoring June 2019-May 2023), at naturally available carrions (N=1, November 2021-February 2023), and by direct observations (N=3, 16-23 August 2020). Nocturnal feeding occurred on 2.6% of monitored provisions at the feeding station (N=349), and at 10% out of ten surveyed naturally-occurring carrions (livestock, red deer). Direct observations yielded 3 successful and 2 unsuccessful nocturnal feeding attempts at a horse carrion. A single vulture along with a wolf were involved in nocturnal feeding on an adult deer (15 vultures recorded during daylight, instead), while, on average, 7 vultures were observed feeding at the horse carrion at night (32.7 during daylight). There, vultures and a single wolf fed together, but vultures retreated as the pack approached. Eighty-five% of diurnal feeding attempts by vultures failed by both human disturbance (50%) and sheepdogs (33%), or wolves (17%), while 75% of successful feeding bouts were nocturnal. Average number of vultures at the feeding station during nocturnal events was 2.9. There, 33% of food provisions were attended by vultures during daylight, before nocturnal feeding occurred. All provisions were attended by vultures at daytime in the day(s) following nocturnal feeding. While the smaller number of Griffon Vultures recorded during night feeding supports the hypothesis of intraspecific competition avoidance, we also highlighted that human disturbance and sheepdogs inhibited vultures' feeding, thus deserving attention. Although nocturnal feeding represents a rewarding alternative, yet vultures become more susceptible to predation risk and interspecific competition.

Keywords: Gyps fulvus, Intraspecific competition, Predation risk, Human disturbance

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LIFE GYP'ACT - Strengthening the reintroduction program to restore the *Gypaetus barbatus* metapopulation between the Alps and the Pyrenees

The Bearded Vulture (*Gypaetus barbatus barbatus*), a priority species listed in Directive 79-409 (CE), has to face numerous threats to its survival: decline and repartition of their population, electrocutions and collisions with power lines and wind turbines, shooting, poison, disturbance and food access disparities. LIFE GYPACT gathers a wide partnership of experts and stakeholders to increase the population of Bearded Vultures from the Pyrenees to the Alps via the Massif Central, with up to 60 birds' releases. It will tackle electrocution and collision mortality by neutralising and securing 20 kms of lines and to enhance knowledge and actions about wind turbine. It will decrease shootings by up to 50%. It will reduce intentional and accidental poisoning by 20% through lead-free munitions and prevention and struggle action plans against intoxications. It will monitor birds and mobilize a canine team. It will reduce human disturbances from flight, noise, recreational activities, and lack of acceptance. It will strengthen the availability of food resources, by creating up to 20 new feeding areas and transnational natural rendering strategy. The main goal of the project is that the Bearded Vulture populations in the regions targeted will be viable at the end of the project and no more reintroductions will be needed.

Keywords: Bearded Vulture, LIFE, translocation programme

Poster presentation

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Aerial Landscape Genetics: Environmental drivers of dispersal patterns in the Andean Condor

Understanding how dispersal patterns are influenced by landscape heterogeneity is critical not only for modeling species connectivity, but also for designing conservation plans and protected areas. Although landscape genetic models are increasingly used in terrestrial and aquatic habitats, they are virtually ignored in aerial environments. This is especially important for obligate soaring birds like vultures which depend on the energy provided by the landscape to move across vast regions. In this work, we estimated contemporary gene-flow rates among Andean condors (*Vultur gryphus*) inhabiting different biomes between the Andean range and the central mountains of Argentina. We used maximum likelihood estimations of isolation-by-resistance models, where conductance is a function of a combination of static and dynamic landscape features hypothesized to influence dispersal in condors, and the observed data are the genetic distances between sampling regions. In addition, we derived landscape resistance surfaces from movement data, using Resource Selection Function, to test the influence of the landscape on different movement behaviors. We found that gene-flow was correlated with the Topographic Position Index (valleys), steep slopes, aspect (northwest face), orographic uplift in winter, and south-north winds in summer. Our model depicting the present functional connectivity of condors in central Argentina showed a large high-connectivity corridor along the Andean range partially isolated from the central mountains which were more connected to the northern portion of the Andes through a stepping-stone mosaic. Landscape features differentially affected resource selection, suggesting that some landscape features are important for some flight behaviors but not for others, and are seasonally dependent. This work highlights that consideration of both habitat selection and landscape genetics models may be useful in developing more comprehensive conservation plans that take into account the complex spatial and temporal habitat requirements of wide-ranging species like vultures.

Keywords: Population connectivity, resistance surfaces, resource selection function, vultures

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Threats for carrion birds in Extremadura and their management

There are various different threats to carrion birds including poisoning, electrocution and collision with power lines, collision with wind turbines and barbed wire, intoxication, vehicular accident or via gunshot, etc. A retrospective study of the admissions of Black Vulture, Griffon Vulture and Egyptian Vulture in the wildlife recovery centres of Extremadura ("Los Hornos", Sierra de Fuentes-Caceres, and "Accion por el Mundo Salvaje-AMUS", Villafranca de los Barros-Badajoz), as sentinel centres to determine the importance of each threat by species and lethality, as well as the evolution of each threat over time during the last five years (2018-2022).

Each discovery of a wounded bird, corpse or egg admitted to a wildlife recovery centre, requires a veterinary clinical examination or a complete necropsy to determine the cause of admission. The generated data is incorporated into a database with a record of the causes of admission of wildlife from the autonomous community of Extremadura.

With this information, an administrative management is carried out by opening a file and taking emergency measures: Cynological team for the detection of corpses in the field in the case of poisonings, notification to authorized agents of the SEPRONA Civil Guard for the investigation of crimes (poisoning, gunshot and habitat destruction). In the case of known indirect causes, sending requirements for the correction of the deficiencies that provoked the incident: electrocution and collision with power lines, wind turbines or barbed wires, and intoxications.

In a preventive sense, the General Directorate of Sustainability of the Junta de Extremadura acts against poisoning and intoxication through the Extremeña Strategy against the illegal use of poisoned baits, against electrocutions and collisions with power lines through the approval of subsidies for their correction, prohibition of the new installation of barbed wires and favoring the change of the ones already installed, news publication of convictions for shooting wildlife (and other crimes), and the study of the suitability of new installation of wind farms. Several nature conservation projects are also being carried out, which include measures such as the tagging of birds for the further detection of threats.

Keywords: mortality causes, wildlife recovery center, threat mitigation.

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LIFE Balkan Detox project: combating wildlife poisoning across the Balkan peninsula

The BalkanDetox LIFE project is dedicated to improving the management of wildlife poisoning incidents in the Balkan countries and achieve significant reduction of mortality of vultures and other affected species caused by wildlife poisoning by ensuring real and continued engagement of relevant governmental authorities in combating this issue and labelling it as a socially unacceptable occurrence in the eyes of the public.

The core actions of our project focus on creating adequate conditions and capacities in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, North Macedonia, and Serbia for establishing a system that can effectively tackle wildlife poisoning, by working together with all relevant stakeholders and by developing and adopting best practices for combating this environmental threat.

The BalkanDetox LIFE project aims to systematically approach the issue of wildlife poisoning in the Balkan region and provide sustainable solutions. Wildlife poisoning is a complex conservation issue that requires active involvement of multiple sectors (law enforcement, forensics, veterinary medicine, toxicology, judiciary system) from the relevant governmental institutions to be able to effectively investigate and sanction this criminal activity, and ultimately to reduce the mortality that it has on numerous species of wildlife. Therefore, we believe that the primary focus of our work should be the relevant governmental institutions from the Balkan countries and their capacities to combat wildlife poisoning.

Our project aimed to secure the necessary engagement of national institutions relevant for wildlife poisoning through the establishment of National Anti-poisoning Working Groups. These working groups were successfully established in six out of seven project countries so far and have led the development and adoption of operational tools and best practices that improved their work in investigating wildlife poisoning incidents.

Keywords: wildlife poisoning, law enforcement, governmental engagement, illegal practice, vultures, Balkan Peninsula

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Conservation Breeding as a conservation tool for South Asian Gyps vultures

When the devastating population crash of South Asian Gyps Vultures was brought to the attention of the world in 1999, and following on, the cause of the decline discovered in 2003, an international meeting was held in India to see what could be done. A number of actions were agreed, including an international survey to discover which NSAIDs had been used safely with vultures, the banning of the NSAID Diclofenac as a veterinary drug and the initiation a conservation breeding programme for the three critically endangered Gyps species in South Asia.

A worldwide survey identified Meloxicam as a 'safe' NSAID, work began immediately on advocacy to implement banning diclofenac, which actually came into force in India in 2006, and collecting of vultures from the wild to start breeding projects. These happened in India, Nepal, and Pakistan.

This paper will discuss the methods used in India and Nepal on conservation breeding of vultures, the ups and downs, successes and failures and the difficulties of funding and running long term conservation breeding projects. We will discuss the longevity needed for such a project and how it depends on the monitoring and status of the species in the wild. Also, the requirement of the continuing drive and passion of those with the heavy responsibility of managing the conservation of these critically endangered species. We will look at how to deal with the successes and failures of such a project and when in some cases to cease the breeding project and to use the time and funds for monitoring and safeguarding the wild populations.

We will also look at the changes, more NSAIDs that are toxic to vultures, safe NSAIDs and what should be done to avert extinction of these important species.

Keywords: NSAIDs, Vultures, Conservation, Breeding

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Exposure to POPs in Griffon and Cinereous Vultures in Spain

Vultures represent a group of birds of great value in the Spanish territory due to their decline in other European regions. These scavenger birds are exposed to several threats among which is the exposure to persistent organic compounds (POPs) such as PAHs, OCPs, PCBs, BDEs. These chemicals are known for their capacity for biomagnification and bioaccumulation as well as their chronic physiological effects on living organisms. The presence of 56 POPs was analyzed by GC-MS in 300 blood samples of two vulture species. Samples from griffon (*Gyps fulvus*, n = 118) and cinerous vulture (*Aegypius monachus*, n = 129), were collected between 2017-2021 in GREFA facilities. Additionally, biological variables such as age, weight and sex were registered for statistical analysis. The results showed more than 95% of the individuals presented residues of any of the compounds. Cinereous Vultures were more exposed to organochlorines (Freq = 86.44%, Me=1.36 ng/ml) and Griffon Vultures to PAHs (Freq = 91.47%, Me= 2.01 ng/ml). The sum of POPs was significantly higher in Griffon Vultures, with the highest concentrations of organochlorines (MAX= 315.83 vs 21.98 ng/ml, respectively). With respect to biological variables, weight did not influence the toxic load of these compounds, but age did, being significantly higher in older animals. Our study demonstrates that the presence of these compounds in the environment is still relevant, despite their prohibitions and legal restrictions. This could pose a risk for the survival of this emblematic group of birds in our country.

Keywords: Griffon Vulture, Cinereous Vulture, Toxicology, POPs, Organochlorines, Bioaccumulation, Wildlife, Scavengers

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1 - GREFA

The influence of landfills on the ranging behavior of juvenile Cinereous Vultures from the reintroduced colonies in the Pyrenees and the Iberian System

The Monachus Project counts on GPS telemetry devices installed on all Cinereous Vultures released in its reintroduction programs. These GPS transmitters allow the investigation of individual fine-scale space use patterns. Within this context, the influence of landfills on vulture ranging behavior is of particular interest since these places are a source of not only abundant food, but also toxic elements (as toxins, anti-inflammatories, antibiotics, plastics, etc.) and other dangerous parts (as strings, rings, bags, etc.). Moreover, moving in landfills faces the risk of adjacent threats such as power lines. Since the beginning of the project in the Pyrenees, juvenile Cinereous Vultures have spent more time every year in the landfills close to the reintroduction site. This study aims to investigate the influence of landfills on the movements of juvenile Cinereous Vultures of the restored colony in the Pyrenees. Doing so, we gained insights on the potential relationship between the growing number of juvenile Cinereous Vultures that feed in landfills and the increase in juvenile mortality by unknown causes in this colony.

Keywords: *Aegypius monachus*, Cinereous Vulture, landfills, juvenile dispersion

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GPS tracking data relates vulture mortality due to acute intoxication at a considerable distance from the site of poisoned bait consumption

Although vultures are not usually a target of intentional poisoning, many vulture populations have been severely affected by it. Poison baits are normally used to regulate the populations of different predatory species. After vultures have consumed poison bait, they can travel a long distance before they die. Thus, dead birds registered cannot be associated with the poison bate and many times the bait remains undetected as well. The present study provides information on the poisoning of some GPS-tracked Griffon and Cinereous Vultures. It also presents important data concerning forensic considerations related to the investigation of cases of wildlife crimes. To prevent further poisoning of birds, proper analysis of GPS data in real-time and quick finding of the poison bait is needed. The present study provides insight into the mechanics of poisoning of vultures and other bird species. It also would seem to indicate that the use of high-resolution GPS transmitters may be the only possible way to find the exact location of the poison bait and to relate away-dying birds with it. This probably means that the percentage of birds that have died from poisoning in the past was much higher than calculated in previous studies conducted using traditional search methods. Consequently, the importance of transmitters in preventing and minimizing poisoning incidents seems to be more and more significant.

Keywords: gps tracking, poisoning, vultures

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Cinereous Vulture's (*Aegypius monachus*) welfare in a breeding centre: activity budget, behaviour analysis and use of space

The Cinereous Vulture is considered to be near threatened globally. The species' conservation measures focus on protecting habitats, increasing available food, reducing mortality and restoring populations via conservation translocations, with some of the vultures originating from breeding centres. It is, therefore, important that these centres have reproductive success and securing good welfare levels should be a priority due to the negative implications a compromised welfare has on reproduction. Thus, welfare assessments should be implemented in breeding centres and, considering the species' sensitivity to human presence, remote methods should be preferred, such as behaviour analysis and use of space using camera systems. No activity budget is currently available, which is valuable for understanding the species' behaviour and detecting irregularities. Therefore, our first objective was to develop an activity budget that could potentially be used as a standard, and the second was to determine if behaviour analysis and use of space could detect welfare issues in a breeding centre. The study was done on 12 vultures at Zoo Planckendael (Belgium). The data on behaviour and location was collected remotely through cameras and ZooMonitor was used to gather data. Statistical analysis was run to create the activity budget, which was then used to detect the study subjects' irregular behaviour patterns. Heatmaps were developed to study space use. The activity budget had similarities to the activity budgets of other members of the Accipitridae family and could potentially be used as a standard for the captive population. Abnormal behaviours and irregular percentages of normal behaviours were detected and the potential need to improve the enclosure and its surroundings were noticed. Altogether, the proposed methodology and results will contribute to the detection of possible welfare issues in breeding centres and, consequently, improve the reproductive success of the centres and the conservation of the species.

Keywords: Cinereous Vulture, conservation, breeding centres, reproductive success, welfare

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1 - Sahara Conservation

The conservation of vultures in an interconnected world: focus on West and Central Africa

Throughout Africa, vultures have declined dramatically in recent decades, with the highest rates in West Africa. One of the main recognized factors is illegal hunting for traditional purposes. Niger and the Chad Basin area have been identified among the largest clusters of vulture habitats in the region, harboring significant populations of threatened vulture species. As wintering grounds, these areas are also crucial for migratory birds.

However, the lack of data, skills and resources is still an obstacle to the protection of these birds in West and Central Africa.

In response, Sahara Conservation has initiated a dedicated program, based on a multi-dimensional approach and involving a wide range of stakeholders. Regular nest monitoring of different vulture species has enabled the collection of substantial information on vulture nesting and their main areas of distribution in Niger and Chad. International collaboration, with the use of satellite transmitter providing unprecedented data, and shared capacities, has also contributed to upgrading the knowledge and conservation actions in the region. Conjointly, studies on threats have been carried out, collecting direct and indirect evidence of vulture trafficking and use. Actions to break the supply chains on both ends, at the source and the demand were implemented, while promoting plant-based alternatives, involving relevant authorities, local communities, hunters and leaders.

Positive results have been achieved in reducing the number of vulture parts for sale in targeted regions of Niger. However, in order to optimize actions and have a lasting impact, it is essential to take a regional approach by initiating joint work with neighboring countries. To move forward, improving knowledge on the ecology, distribution, and reproduction of vultures, as well as on the potential causes of mortality in areas for which we have less data is also a priority.

Keywords: wintering grounds, Niger, Chad, illegal killing, conservation

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Testing of methods to evaluate population numbers of the Egyptian Vulture (*Neophron percnopterus*) in Nepal

Despite Egyptian Vulture (*Neophron percnopterus*) being globally endangered, species monitoring and targeted conservation actions in Nepal and generally in south Asia are scarce. Thus, since 2012 we started collecting data on the Egyptian Vulture distribution and numbers at different congregation and nesting sites in Nepal. We have accomplished 316 counts for the period with a maximum of 232 birds observed at the Sanitary landfill of Pokhara. The annual count locations range from 15 to 56 sites where local dump sites of Pokhara, Damauli, Sandhikharka hold the majority of the birds (up to 232 individuals). In this regard, the Egyptian Vulture is mostly distributed in central and western Nepal and seems stable for the study period with no fluctuations in the numbers. We also obtained 60 locations of active nests of Egyptian Vultures, most of them on cliffs and a few on trees. We identified potential nesting habitat for the Egyptian Vulture in Nepal using ecological niche modeling with climatic variables. We estimated the currently suitable nesting habitat for Egyptian Vulture in Nepal at 38,204 km2 which is about 25.9% of the country. We found a high probability of suitable nesting habitat on east-facing aspects, and the probability of a suitable nesting habitat was greater in more mountainous areas, particularly in the central and western regions of Nepal. We recommend coordinated, widespread, and long-term monitoring of Egyptian Vulture across South Asia, including tagging of birds, garbage dumpsites counts, in order to estimate population numbers of different sub species, understand their dispersal and the threats that birds face across the region.

Keywords: garbage, modeling, nests, suitable habitat, threats

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The effects of food predictability on the foraging ecology of African White-backed Vultures (*Gyps africanus*)

As scavengers, vultures are specially adapted to find and feed on carrion - a patchily distributed and ephemeral resource. However, decreasing natural areas and wild ungulate herds, as well as increasing human activity in Africa, have led to shifts in feeding behaviour to use human-mediated sources for African vultures in some areas, most prominently abattoirs (slaughterhouses) and vulture restaurants (supplementary feeding sites). Both are more predictable on a temporal and spatial scale than natural sources that vultures would consume. Understanding how African vultures are affected by this change in food predictability will give better insight to their adaptability and allow conservationists to better predict how these scavengers may react to changing environments in the future. To determine this impact, I am analysing GPS telemetry movement data from four populations of African white-backed vultures (*Gyps africanus*) over several years. In East Tanzania and West Tanzania, vultures primarily feed on natural food sources from ungulate herds and elephants that are readily available. In Ethiopia abattoirs are more common food sources. In South Africa vultures have access to both natural and human-mediated food sources, particularly vulture restaurants. Foraging patterns of each population have been summarised from movement, range size, and identified feeding events. Random forest methods were then applied to these values to determine differences in overall foraging behaviour between these geographic regions. Understanding how the food that vultures feed on affects their movement ecology will provide broader insights into adaptability of these endangered species and how resource predictability may impact social scavengers more generally.

Keywords: Foraging ecology, GPS telemetry, Food predictability

Manon Quetstroey[1]

1 - Renewables Grid Initiative

LIFE SafeLines4Birds. Reducing bird mortality caused by power lines

SafeLines4Birds is a 6-year project – co-financed by the LIFE Programme – which aims to reduce the mortality of 13 bird species around power lines in France, Belgium and Portugal. The project relies on four main goals: reduce bird collision, electrocution and disturbance, as well as improve and share knowledge across Europe.

Amongst the project's 13 target species, the Bearded Vulture, Cinereous Vulture and Egyptian Vulture are the Vulture species which are most impacted by power lines.

To tackle the collision risk, existing anti-collision diverters will be installed and new devices tested, such as the American ultra-violet Avian Collision System Avoidance, tested for the first time un Europe, which uses UV light to make lines more visible at night. The performance of the installed devices will be evaluated using cameras. In high-risk areas, lines will be placed underground to completely eliminate the risk of collision and electrocution. The project aims to reduce collision by 75% for the Bearded Vulture and by 83% for the Cinereous and the Egyptian Vultures.

To reduce electrocution, dangerous power poles will be retrofitted and insulated, and deterrence devices installed as well as platforms and perches to protect roosting and nesting individuals. This aims to reduce electrocution by 90 % for the Vulture species in targeted sites.

Finally, to avoid disturbance and nest abandonment during breeding season, grid maintenance methodology will be adapted, thus preventing any disturbance to Vulture pairs.

Moreover, a SafeLines4Birds open digital platform will be created to centralise all technical information gathered during the project and share it in an open and standardised way, benefiting the understanding about bird-grid interactions and the effectiveness of the tested mitigation measures.

The consortium consists of 15 partners from France, Belgium, Portugal, Germany and the United-States, including transmission and distribution grid operators, NGOs and scientific experts.

Keywords: Birds, Collision, Electrocution, Disturbance, European collaboration, LIFE Programme, Power lines

Poster presentation

Rainer Raab[1]

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Investigating the main mortality reasons of the European Red Kite population by high-resolution GPS telemetry tracking

The main goal of the LIFE EUROKITE project is to reduce anthropogenic causes of mortality of the red kite in Europe. The efficient protection of the red kite requires the detailed understanding of overall mortality reasons, especially focusing on those caused by legal and illegal human activities. The LIFE EUROKITE project focuses on a Europe-wide representative sample which is achieved by using high-resolution GPS telemetry tracking of 2,321 tagged red kites from 14 European countries, allowing fast and exact locating of dead birds. This considerable database is only possible through cooperation and data exchange with multiple international partners.

By 25/04/2023 more than 975 red kites have already died (not including transmitter failures). Using a standardized protocol for the European-wide assessment of morbidity and mortality of raptors by performing necropsy procedures, it has been proven that 138 of 751 completely analysed tagged red kites have died from poisoning. In total, 355 tagged red kites have died from anthropogenic causes such as poisoning, collision, electrocution and shooting.

We used the "integrated Step-Selection Function (iSSF)" to learn the behaviour of tagged red kites and predict the species-specific probability of anthropogenic mortality factors of red kites across countries and regions in Europe.

Only by using such large and European-wide telemetry-assisted datasets unbiased results of human-caused mortality of red kites can be obtained. This is essential to take appropriate measures for the protection of the red kite.

Keywords: red kite, *Milvus milvus*, mortality, raptor persecution, poisoning, europe

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The Vulture Reintroduction Program in Assam, India

The White-rumped Vulture, *Gyps bengalensis* and Slender-billed Vulture, *Gyps tenuirostris* are being reared and bred in captivity in Assam, India since 2007 and the Vulture Safe Zone Program is being carried out in 14 districts of Assam since 2013. The strategy and planning for reintroduction of these vultures is under consideration since their captive breeding is successful and satisfactory reduction in availability of banned NSAIDs in the market. The site for reintroduction must be strategically close to the breeding center, for convenience of staff and efficient infrastructure management. The potential area must be surveyed for- 1) availability of vulture toxic NSAIDs in pharmacies, 2) food for the vultures and 3) the cattle carcasses must be examined for the presence of NSAIDs in the liver. The existence of 'wild vulture population' and 'Protected Areas' in reintroduction zone will serve as a plus point for the purpose. The safety of vultures will be achieved by conducting awareness among the locals through the awareness and advocacy efforts. The State level stakeholders are identified as the Forest Department, the Animal Husbandry and Veterinary department, the Drug controller and the cattle owners (farmers). The reintroduction of the vultures is a scientific and systematic process where the small flock of vultures will be maintained in a release aviary for three months. These birds would get acclimatized to the surrounding environment and get familiar to the wild counterparts. The vultures will be tagged with PTTs and Darwic rings. Once the physical fitness is confirmed, vultures will be released to wilderness. The key activities for successful reintroduction are food provision for the vultures near the release site, regular tracking of the vultures, and rescuing the weak and sick birds.

Keywords: Gyps vulture, captive breeding, reintroduction

Vulture Research Consortium[1]; Martina Scacco[2]; Anne K. Scharf[2]

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Vulture Research Consortium (VRC)

Initiatives bringing together large amounts of tracking data like the Arctic Animal Movement Archive (AAMA), the Yellowstone to Yukon Conservation Initiative (Y2Y), the Retrospective Analysis of Antartic Movement Data (RAATD) and the effort resulting in the work of Tucker et al. 2008 Science, makes it possible to ask questions and get answers and insights that otherwise would not be possible. Therefore we would like to bring together the global community of vulture researchers to facilitate future collaborative research and conservation efforts on vultures, by creating the Vulture Research Consortium (VRC).

We initiated the Drylands project as the first collaborative research project of the VRC. With this project we aim at bringing together a large amount of tracking data of multiple vultures species, at global scale, to study the relationships between vulture communities and drylands. In particular we are interested in how vulture movement patterns are affected by and change with different dryland indicators, such as change in water availability and other biotic and abiotic desertification-associated processes. Currently 30 VRC partners have contributed GPS tracking data, totalling over 220 million locations of over 1600 individuals from 16 vulture species (out of 23 extant species), recorded from 2006 to 2023, across all continents. The call for joining this project is still open.

Even though we do not have access to all existent tracking data, we already have the unique opportunity to find possible gaps in spatial knowledge, i.e. areas where we know vulture populations exist but where currently we seem to lack tracking data. This will help to inform future foci in bio-logging efforts for large scavenging birds.

Keywords: consortium, tracking data, drylands, collaboration

Pedro Ribeiro[1]; Carlos Pacheco[2]; João Silva[2]; Sara Aliácar[1]

1 - Rewilding Portugal; 2 - CIBIO

The discovery of a new colony of Cinereous Vultures in Malcata Nature Reserve: population status and prospects

Cinereous Vultures (*Aegypius monachus*) are classified as Critically Endangered by IUCN standards in Portugal. After the discovery of a breeding couple in Malcata Nature Reserve by the National Institute of Nature and Forest Conservation (ICNF) in 2021, we started tagging individuals to assess the expansion from Serra da Gata and their landscape use to develop a rewilding strategy to expand the species breeding territory in Malcata and to the Greater Côa Valley. The first two animals were tagged with GPS tracking devices in 2021, in the Reserve's feeding station, which has some of the highest counts of Cinereous Vultures in vulture restaurants in Portugal. We observed a great variability of behaviors between the juveniles. One bird migrated to West Africa, staying for the winter, and returning to Spain in the spring, whereas the other led to the discovery of a new nest in Malcata where it stayed throughout the winter with small exploratory movements to Serra da Gata. Rewilding Portugal focused on monitoring from 2021 onwards, discovering a total of 10 of the 13 breeding couples currently known in Malcata Nature Reserve. Malcata is hosting a well-developed colony of Cinereous Vulture that was until then unknown, showing that the expansion of the species along the Central Mountainous System and the transboundary Lusitanian corridor is more advanced than previously thought. Currently, our efforts are focused in estimating the real size of the colony and in increasing food availability through free carcass deposition and promotion of the increase of wild ungulate populations. Identified threats for the species include large extensions of monocultures and current forestry management. A rewilding strategy implemented in the Reserve could greatly benefit the expansion of the species, bringing carnivores and more herbivores back to Malcata and diversifying the landscape with more native close and open woodlands and grasslands.

Keywords: GPS Tagging, Cinereous Vulture Colony, Rewilding

Poster presentation

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1 - Rewilding Portugal; 2 - CIBIO

Using GPS data to study Vulture feeding ecology in the Greater Côa Valley

Understanding vulture spatial ecology and foraging behavior is key to identify habitat preferences and design conservation actions, but data is still scarce in Portugal. In 2019 we started tagging, with GPS tracking devices, resident vultures in the Greater Côa Valley and surrounding areas to understand how they use the landscape for foraging to develop a rewilding strategy that promotes an increase of less predictable sources of food, like livestock carcasses freely disposed and wild herbivores. Between 2019 and 2021, eight Griffon Vultures (*Gyps fulvus*) and two Cinereous Vultures (*Aegypius monachus*) were captured in Guarda district and fitted with GPS/GSM devices. Loggers recorded a burst of locations every 20 minutes, containing 10 consecutive GPS and 3D accelerometer readings at 1 Hz providing the location of the bird and the instantaneous acceleration at that given moment in three axes. Feeding behavior was inferred using accelerometer data combined with a visual inspection of GPS locations in recent aerial photographs. This allowed us to identify 462 possible events, of which 42 were verified in the field. We obtained 314 feeding locations, of which 74% were in Spain and 26% in Portugal; 60% outside RN2000 sites; 60% were in extensive farming areas and another 14% in extensive farms with feedlots; only 5% were in vulture feeding stations; 70% of feeding events occurred in open areas such as grassland and open forests. Brownian Bridge Movement modelling allowed for the identification of important areas of utilization, like nesting sites, dormitories or frequently used foraging areas. Individual tracking also enabled the discovery of a new colony of Cinereous Vultures in Serra da Malcata and was detrimental for the design of a network of free carcass deposition areas along the Greater Côa Valley and to share information with managers to help protect important sites for vultures.

Keywords: Spatial Ecology, Foraging Behaviour, GPS Tagging

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Tagging vultures in Zambia – movement dynamics in extensive wilderness areas

Populations of African vulture species have experienced dramatic declines in the past decades with the four most impacted species declining by approx. 50% every decade. Zambia has vast wildlife areas that include 20 national parks and 36 game management areas covering about 30% of the country (231,000 km^2). Information on home ranges, i.e. overlap with protected areas, activity patterns, movements and breeding zones are critical to meaningful long-term conservation of vultures in Zambia. This study uses satellite and GSM telemetry data to assess movements of vultures. In August 2021 and in August 2022 a total 29 vultures of three species were tagged with either satellite or GSM tags. Additional birds will be tagged in July 2023. Here we report results on movement dynamics and flyways.

Keywords: vultures, Zambia, home range, protected area, activity pattern, conservation

Agustín Riopérez[1]

1 - DTBird & DTBat

DTBird tool for vulture protection and collision control at wind farms

DTBird is an automatic system that detects flying birds and performs real time actions to birds flying in collision risk areas. Used for bird monitoring, and for bird mortality reduction in operating wind farms. It has 4 modules:

- DTBird Detection, continuously monitors surveillance area and detects flying birds in real time.
- DTBird Collision Control, detects and records potential collisions with the WTG: blades, tower, nacelle.
- DTBird Collision Avoidance, emits warning/dissuasion sounds to birds flying in collision risk areas.
- DTBird Stop Control, sends a Stop signal to the Wind Turbine Generator (WTG) according to the collision risk.

Since commercially available in 2009, DTBird has seen the increase of turbine rotor dimensions from 45 to 160m. Based on project experience, WTGs stopping time ranges from 20 – 60 s across wind speeds of 5 – 10 m/s. The higher rotor diameter normally implies longer stop time.

Given the blade tip speed and Rotor Swept Zone (RSZ) area of the increasing size of the WTGs currently installed and projected, vultures become one the species more vulnerable. In order to reduce the Vultures collision risk in large WTGs long triggering stop distances and thus high number of WTG stops are needed, with the corresponding energy production losses. Additionally, bad vultures hearing plus large WTGs limits the efficiency of the sound deterrence.

To provide high detection efficiency on large WTGs, different DTBird Detection models can be selected with several configurations of camaras. To mitigate the reduction of sound deterrence efficiency several configuration and locations of speakers are available. To reduce energy production losses while keeping high efficiency of vulture protection different customized protocols are configurated based on bird activity thresholds, daily activity time, wind speed, or individual/groups of birds. Data transparency, energy production and vulture conservation can be balanced with the DTBird tool.

Keywords: bird monitoring system, vultures, collision risk, DTBird

Poster presentation

Vanessa Rodrigues[1]

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Environmental impact studies as contributors for scientific species knowledge: vultures, a case study

The number of environmental impact studies have increased throughout the years in Portugal, thus enlarging the volume of available data, especially for birds and bats due to the development of energy infrastructures, such as wind and solar farms and power lines, that impact mainly this fauna groups. The main contributors for the rise of such amount of information are environmental consulting companies, which cover a large geographic area due to the projects they develop, collecting a greater diversity of data.

Using vultures as a case of study, the present work aims to demonstrate how the aforementioned companies can collect data that can be used by other organizations for species conservation. In the last five years our teams as been collecting several records of vultures, using standard methods, such as vantage points, all around Portugal.

In this context, two species of vultures were observed during field studies: Griffon Vulture (*Gyps fulvus*) and Black Vulture (*Aegypius monachus*). The distribution and abundance were estimated by mapping individuals' movements and number through the years, based on GIS mapping (500x500 grid) for the whole country.

Hence, conservation companies could benefit from the great amount of information available in environmental consulting studies, namely distribution and abundance, helping to improve que quality of their intervention by supporting it with enhanced data.

Keywords: Vultures, Environmental, Impact, Conservation, Monitoring

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GPS-tracked vultures as a tool for improving carcass management and biodiversity conservation in Portugal

GPS monitoring of wildlife provides useful information to inform environmental and sectorial policies, potentially affecting conservation, contributing to improve the effectiveness of these norms. In Portugal, the availability of livestock carcasses for scavengers and the level of compliance with the existing sanitary regulations affecting carcass disposal (e.g., Regulations EC 1069/2009 and EU 142/2011) remains unknown. We monitored 12 GPS-tagged Griffon Vultures (*Gyps fulvus*) in northeastern Portugal, between March 2020 and May 2021, to assess: 1) carcass availability for scavengers, and 2) compliance with the enforced legislation on livestock carcass disposal. We visited clusters of vulture GPS locations in the field to collect information on the species, livestock breed, age and possible origin (i.e., "in situ" mortality or deliberate corpse deposition). Overall, 69 out of 162 clusters identified as potential feeding sites were undoubtedly confirmed as feeding events by vultures. Livestock accounted for 91.6% of the carcasses detected (n = 95). Most carcasses were ovine (62.1%), followed by porcine (25.3%), caprine (8.0%) and bovine (4.6%). From this sample, 33.3% of the carcasses were categorized as "in situ" mortality, whereas 55.2% of them were found at unauthorized dumping sites for carcass disposal. Although a priori all the carcasses were found in areas which could be proposed as potential Scavenger Feeding Zones (SFZs) under the Portuguese legislation (Despacho 7148/2019), SFZs have not been actively enforced yet, resulting in none of the located carcasses complying with existing regulations. Compliance level for carcass disposal could increase up to 63.2%, depending on the livestock species, breed and age limits, if the already proposed SFZs on paper would be officially implemented in practice; reconciling biodiversity conservation with animal and public health.

Keywords: GPS-monitoring, Law enforcement, Livestock carcasses, Sanitary regulations, Scavengers Feeding Zones (SFZs), Vultures

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Sentinel species to inform conservation efforts: an example using Griffon and Bearded Vultures to fight against wildlife poisoning

Wildlife poisoning is widely recognized as one of the primary factors driving vulture population declines. Patrolling (e.g., canine-unit patrolling efforts) is frequently used as a measure to fight against wildlife poisoning. However, how to prioritize the most important areas to implement this conservation action remains a challenge. Assessing the use of the space by sentinel species can help to identify priority areas and optimize patrolling efforts. We illustrate this by comparatively analyzing space use by 16 GPS-tagged Griffon Vultures (*Gyps fulvus*) and 26 reintroduced Bearded Vultures (*Gypaetus barbatus*) from 2016 to 2022 in Asturias (northern Spain), with risk maps of illegal wildlife poisoning and canine-unit patrolling efforts aimed at detecting poisoning events. Both vulture species are largely affected by poisoning and serve as reliable sentinels for this major biodiversity threat. A strong spatial overlap was observed between the areas most frequented by each species and those under higher risk of wildlife poisoning in the study area. Griffon Vultures displayed a broader spatial usage, while Bearded Vultures faced a higher poisoning risk in their core areas. Patrolling actions highly correlated in space with areas of high use by vultures, with differences depending on the funding sources. Species-specific efforts (i.e., actions within the Bearded Vulture Reintroduction Project) demonstrated better alignment with the targeted species, while actions conducted by the competent authorities maintained a significant association with the spatial usage of both species. Areas where patrolling efforts have been lacking, despite presenting high vulture activity, have been identified. Our approach shows the utility of integrating vulture spatial utilization data to identify key areas for implementing patrolling and conservation actions. This multi-species framework allows to account for regional variations, and highlights the role of both species as sentinels to inform this wildlife threat.

Keywords: Anti-poison canine units, Autocorrelated Kernel Density Estimate, Exposure risk, GPS-monitoring, Movement ecology, Patrolling actions, Scavengers

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Carrion birds and energy transition in Extremadura (SW Spain): state of the situation

In the present work we expose the existing relationship between the development of the energy transition with the development of the energy planning, renewable energies and carrion birds (Black Vulture, Griffon Vulture, Egyptian Vulture, Red Kite and Black Kite) in Extremadura, in three lines of work:

1 - Input of food to artificial feeding stations (AFS).

2 - Mortality of specimens of carrion birds in power lines and wind farms in Extremadura and mitigation measures.

3 - Design of a map of capacity to receive wind farms projects.

For the elaboration of the different strategies we use as a base the censuses of the different species, assigning a critical area to each breeding territory; we also consider the artificial feeding stations, rubbish dumps and other feeding points, assigning buffer protection (2 kms to nests or AFS and 4 kms to rubbish dumps) to calculate the capacity of wind reception. It was also contrasted with the work of collision risk analysis obtained through flights of 178 Griffon Vultures (Jon et. al, in press), where the risk of collision with wind farms was calculated, complementing the information of breeding areas and managed feeding areas.

With the areas of power lines at risk of collision, planning was carried out to signpost the areas with the highest risk of collision for carrion birds, having proceeded to signposted more than 100 kms of power lines.

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Monitoring of necrophagous bird population in Extremadura and its management

Necrophagous birds play an essential role in the proper functioning of ecosystems. Within the community of necrophagous birds, here we refer to the three main species of vultures that can be observed in Extremadura (Black Vulture, Griffon Vulture and Egyptian Vulture). Its status and distribution is essential to carrying out any effort aimed at improving its habitat and conservation. Numerous projects have been carried out for this purpose.

Extremadura is one of the most important European regions in the conservation for necrophagous birds, since it harbors one of the largest populations in the world of the Black Vulture (*Aegypius monachus*), with more than 1,200 breeding pairs registered, this amounts to almost half of the European population of this species, also hosting the most important wintering areas in Europe for the Egyptian Vulture (*Neophron percnopterus*), and one of the most important areas of the Iberian Peninsula for the feeding of the Griffon Vulture (*Gyps fulvus*).

Directive 2009/147/EC of the European parliament and of the council of 30th November 2009 on the conservation of wild birds, establishes that Member States shall take the requisite measures to preserve, maintain or re-establish a sufficient diversity and areas of habitats for all the species of birds referred to in Article 1, among which are the Black Vulture and the Egyptian Vulture, classified in Extremadura as "In danger of extinction" and "Vulnerable" according to CREAE. That is why, in the region of Extremadura, specific follow-up and monitoring projects are carried out annually on their populations.

In the case of the Black Vulture, despite the global population trend being downward, in Extremadura it has experienced notable growth in the last decade, with a sustained annual growth of 5%, especially around the three large breeding colonies and also due to a greater census effort (LIFE Project), which has meant the knowledge of new couples of which there was no record. On June 21st, 2005, the Order of June 6, 2005 issued by the Minister of Agriculture and the Environment approving the Black Vulture Habitat Conservation Plan in Extremadura was published in the Official Gazette of Extremadura. The consequence of all the above is that the number of couples registered in the region has gone from 722 couples in 2004 to 1,270 couples in 2022, which represents an increase of 43.15% in 18 years. The same did not occur with the Egyptian Vulture, whose number of censored pairs fell from 157 in 2010 to 141 in 2022, however, the number of wintering Egyptian Vultures has grown every year, by to 200 specimens.

The purpose of this presentation is to provide updated information on the census methodology, distribution and conservation status of necrophagous birds population in Extremadura.

Alberto Sánchez-Cano[1]; José Antonio Donázar[2]; Marta Barral[3]; Eneko Arrondo[4]; José Antonio Sánchze-Zapata[4]; Ainara Cortés-Avizanda[5]; Ursula Höfle[1]

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Highly pathogenic H5N1 avian influenza: a new threat to free-living and captive vultures

Vultures are considered resistant to pathogens, but in 2022 highly pathogenic avian influenza virus (HPAIV) H5N1 affected griffon (*Gyps fulvus*) and Bearded Vultures (*Gypaetus barbatus*). Samples collected in a program on movement ecology of Spanish Griffon Vultures and retrospective analysis showed that both species are highly susceptible but that Griffon Vultures may survive infection. Of 91 nestling and adult Griffon Vultures ringed and radio-tagged in 2021 (n = 50) and 2022 (n= 41) vascular feather and blood samples were taken. We confirmed highly pathogenic H5N1 AIV in feather pulp and bone of deceased, highly decomposed, nestlings detected in June 2022. Feathers of all other vultures except a nestling that died after tagging were negative by real time RTPCR. An additional nestling that died after fledging and visiting a watering trough frequented by Griffon Vultures was also positive for HPAIV H5N1. None of the vultures sampled in 2021 had antibodies against H5 AIV, while two nestlings from 2022 that fledged in 2022 had high titres of antibodies against H5N1 by haemagglutination inhibition test, showing they had survived the infection and fledged. Other cases in 2022 include three Bearded Vulture chicks in Navarra and Jaen, and vultures admitted with CNS signs to rehabilitation centres in central Spain and the Basque country, and one of five vultures in Aragon mis-diagnosed as poisoned. None of 13 Griffon Vultures captured in Teruel in autumn 2022 and four Bearded Vultures captured in Catalonia tested positive for AIV and neither did six Griffon Vultures captured in April 2023. Nevertheless in autumn 2022, 11/44 (7/7 in Northern and 4/37 in central Spain) and 5/6 of the vultures captured in spring 2023 had antibodies, while none of the Bearded Vultures did so. Further investigation should determine whether surviving Griffon Vultures could become persistently infected and spread the disease.

Keywords: H5N1 Avian Influenza, Griffon Vulture, Bearded Vulture, Eco-epidemiology, Survival

Poster presentation

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1 - Parco Natura Viva - Garda Zoological Park; 2 - University of Bologna; 3 - Marlow Birdpark

The efforts of Parco Natura Viva for conservation of vultures: the *Sarcogyps calvus* project

The red-headed vulture (*Sarcogyps calvus*) was once widespread in India and SE Asia, but is today Critically Endangered due to an extremely rapid population decline. Feeding on carcasses of livestock treated with the veterinary drug Diclofenac is presumed to be one of the major causes of this massive decline, and conservation breeding efforts are urgently needed for this bird. Parco Natura Viva has been putting great effort and energy into this goal. Parco Natura Viva had a success in early 2013. An egg was laid on 16 February and put into an incubator nine days later, and a second egg was laid on 29 March and put into the incubator after 17 days. The staff of Parco Natura Viva discovered that the eggs required a longer incubation period – an average of 55 days – than had previously been reported in the literature, and the chicks were born in March and April and hand-reared. After this important step, other chicks were born in the following years, but all of the chicks were artificially incubated and hand-reared till the winter 2020 during which there was not a possibility to hand reared the chick due to the COVID emergency. The staff of Parco Natura Viva left the egg with the parents and on the 56th day of incubation a very nice chick was born. The parents were not expert and very funny behaviors were observed. However, with "trials and errors" strategy the parents have been taking care of the chick and he has been growing well. This is the very first time of this such great and exciting event in zoos. In 2021 another egg was laid and also this time the parents reared the chick for the second time. This pair gives hope for the future of this critically endangered species.

Keywords: Release, reintroduction, hand rearing, parent rearing, endangered

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Project SURVIVALIST: SURVIVAL In Space and Time: Identifying mortality bottlenecks along the annual cycle of vultures

Understanding the extent of animal mortality, the where and when mortality occurs, is paramount to implement effective conservation actions and secure the persistence of animal populations. Unfortunately, so far our understanding of animal survival (which is the inverse of mortality) is very limited, even for well-studied species such as vultures. Project SURVIVALIST has the ambitious objective of filling this knowledge gap for three European vultures (Griffon, Cinereous and Bearded vulture). Based on a large collaborative network, SURVIVALIST collated a uniquely large dataset (including >1400 vulture individuals across the three species) of high-resolution vulture tracking data. These data are analysed using novel approaches to quantify survival in time across the species annual cycle (e.g. during the breeding and non-breeding season) and life-stages (juvenile, immature, adults; Objective 1). Survival variation for each species will then be mapped across space by integrating survival modeling with space use from the tracking data, to identify hotspots of vulture mortality (Objective 2). The project also aims to quantify the magnitude of different mortality causes among the various European vulture populations using a robust approach that avoids common biases associated to these data, like reporting biases. A protocol for standardizing the collation of tracking and life-history data will be presented, along with the current status of the project and preliminary results.

Keywords: Vultures, Scavengers, Survival modeling, space use, mortality cause, anthropogenic impacts

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Cinereous Vulture (*Aegypius monachus*) recolonisation of Herdade da Contenda (Southeastern Portugal): characterisation, evolution and conservation

The Cinereous Vulture *Aegypius monachus* is currently the rarest and most threatened vulture (regularly occurring) in Portugal, considered Critically Endangered. After its disappearance as a breeder in the early '1970s, it restarted to breed successfully in 2010. Since then, it has gradually increased its breeding population in Portugal, which currently holds over 70 breeding pairs (2023), distributed along four different areas.

In Southeastern Portugal, the Cinereous Vulture restarted breeding successfully in 2015 after targeted conservation efforts, namely through the implementation of the Habitat Lince Abutre LIFE project (2010-2014). This project consisted in the establishment of management agreements with local landowners/managers in 10.000+ ha with the objective of promoting the feeding, settling and breeding conditions for Cinereous Vulture in the Mourão/Moura/Barrancos (MMB) and Vale do Guadiana Special Protection Areas (SPA) (Alentejo, Southeastern Portugal).

Subsequently to the implementation of those conservation efforts, which are currently being followed-up in the scope of the LIFE Aegypius Return project (2022-2027), and benefiting from the continued increase of the Spanish population in the last decades, in 2015 two pairs of Cinereous Vulture nested in artificial platforms in Herdade da Contenda (a public Estate owned by the Municipality of Moura, located in the MMB SPA). One of these pairs bred successfully, which resulted in one fledgling, the first being recorded in Alentejo after over 40 years. Since then, the number of breeding pairs recorded in the area has gradually increased, as well as the number of nestlings/fledglings. In 2023 there was a total of 17-18 pairs nesting, of which at least 12 have started incubation.

The establishment and evolution of a Cinereous Vulture breeding nucleus in Herdade da Contenda, between 2015 and 2023, is characterised and discussed, including aspects relevant for the species' conservation, not only in this area but potentially also in other similar regions.

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Back to the Alps: Trends in population size and drivers of breeding success in a reintroduced Bearded Vulture population

Vulture populations have dramatically decreased worldwide over the last decades. In Europe, various programs have been implemented to reintroduce or restock vulture populations. In the Alps, the Bearded Vulture (*Gypaetus barbatus*) was eradicated in the early 20th century and an international reintroduction program was launched in 1986. Based on the intensive monitoring of Bearded Vulture breeding territories over 26 years (1995-2021), we show spatial and temporal changes in population size and assess environmental and individual factors influencing breeding performance across four countries of the Alpine arc. The number of breeding pairs increased regularly during the study period, from 1 in 1995 to 65 in 2021. In parallel, the yearly number of fledged vultures increased from 0 in 1995 to 42 in 2021. Breeding success (proportion of clutches leading to a fledgling) of the entire alpine population was 68.7%. Results of our analysis including environmental and anthropogenic variables showed that breeding success was positively influenced by nest height, negatively by spring rainfall and varied quadratically with laying date. A non-linear negative relationship between neighbor density and breeding success suggested density-dependence of breeding success above a certain threshold. In addition, breeding success increased significantly when the proportion of strictly protected areas covered more than 40% of the buffer area around the nest. The full model indicated that nest altitude influenced positively breeding success and that pairs composed by wild-hatched individuals had a higher breeding success than pairs including released individuals. Our results confirmed the general positive trend of the reintroduced Alpine population but also highlighted higher vulnerability of birds breeding in the Eastern Alps. Finally, our results suggest that an effective network of protected areas can assist in the establishment of reintroduced populations and we identified directions for further research on the effects of protected areas on Bearded Vulture vital rates.

Keywords: Conservation, Reintroduction, Protected areas, Population trend, Raptor

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Pilot testing and assessment of methods to reduce human-wildlife conflict as driver of the use of poison in Greece

Human-wildlife conflict is one of the most common drivers behind the use of poison baits, particularly in the case of large carnivores that predate on livestock. In Greece poison has been identified as the most important threat for the surviving vulture populations. In the framework of the LIFE project "Egyptian Vulture New Life" (LIFE16 NAT/BG/000874) livestock breeders in project areas were provided with three forms of protection from predator attacks, namely local breeds of livestock guardian dogs (LGD), fladry fences and foxlights (the latter two tried by stockbreeders for the first time in Greece), in order to examine their suitability in the Greek landscape and socio-economic circumstances and evaluate if they should be promoted as deterrent methods among Greek livestock breeders. Where feasible, method effectiveness was assessed using PIR motion sensor cameras to monitor the activity of targeted wildlife whereas perceived effectiveness, applicability and level of acceptance was assessed by means of questionnaires to the participants. All three methods were positively received by livestock breeders as none of them registered any losses due to predator attacks while using them. Between methods, the participants relied mainly on LGDs (especially local breeds) but strongly favoured a combination of methods. Foxlights were particularly preferred mainly due to their easiness in installation and maintenance. Cameras helped to confirm that the effectiveness of fladry fences against wolves decreases with time whereas foxlights can effectively deter other wildlife. This initial assessment of the methods provides information on the advantages and drawbacks of each of them so that livestock breeders and decision makers can make an informed decision as to which method to use or promote.

Keywords: Wildlife poisoning, Human-wildlife conflict, Egyptian Vulture, Livestock protection methods

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Metronidazole induced neurotoxicity in a Eurasian Griffon Vulture - a case report

Eurasian Griffon Vultures are obligate scavengers, relying on carrion for their survival, predisposing these animals to poisoning. Poisoning diagnosis is often difficult and labouring leading clinicians to act and treat the animals while waiting for laboratory confirmation.

A second-year Eurasian Griffon Vulture was found debilitated and was forwarded to our Wildlife Rehabilitation Centre in Northern Portugal. On admission a complete physical exam revealed dehydration and a partially filled crop, with pasty content. Blood work revealed increased urea, uric acid, and leucocytosis. IV fluid therapy was started and after a few hours the animal was active. Melena was identified later, and preventive antibiotic therapy started with IV metronidazole (25 mg/kg, BID). The next morning the animal was depressed but its mental status improved during the day. On the 3rd day a seizure episode was witnessed after IV metronidazole administration. Blood biochemistry showed elevation of AST and CK, with all other tested parameters inside our laboratory reference ranges. Fluid therapy was resumed, and the mental status of the animal improved during the day. On the evening scheduled administration of metronidazole the animal started convulsing during the bolus administration. Metronidazole therapy was suspended, and the line washed out. The next day the animal was alert and eating on its own. Evidencing a normal physical exam, the animal moved to an outside enclosure without any supportive. The vulture was released back into the wild one month later.

Metronidazole neurotoxicity has been diagnosed in other animals, as dogs and cats, with ataxia being the commonest sign. Although plasma metronidazole concentration was not measured, we believe the onset of depression and the seizure episodes were related to its administration and its cessation resolved the clinical signs. To ascertain its safety in this specie, pharmacological studies of metronidazole in Eurasian Griffon Vultures must be conducted.

Keywords: Metronidazole, Neurotoxicity, Eurasian Griffon Vulture

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Management of a thoracic vertebral fracture in a Eurasian Griffon Vulture

The most common causes of admission of vultures in rehabilitation centers include poisoning, electrocution, collision and starvation. Juvenile individuals are often captured in poor body condition, debilitated and dehydrated, due to getting lost in the scattering movements.

A second-year Eurasian Griffon Vulture was admitted to a Wildlife Rehabilitation Centre after being found unable to stand in a field. On the neurological exam upper Motoneuron signs of the pelvic limbs and cloacal sphincter, with normal findings in the thoracic limbs pointed for a medullary lesion between T1 and the synsacrum. On X-ray, a clearly visible fracture of T2 with a collapse of the vertebral body was identified. As sensation was still present in the pelvic limbs a CT scan was performed. T2 fracture with collapsed vertebral canal was diagnosed. Conservative treatment was elected to manage this fracture. Intravenous fluid therapy and meloxicam, a non-steroidal anti-inflammatory drug, were initiated and the animal was put on cage rest. Forced feeding was started on the following day. The animal showed improvements 3 days later, becoming able to correct its limbs to stay in the prone position. On day 7 the animal was able to stand and to feed on its own and was moved to a confined outdoor enclosure. A month later a new CT scan confirmed the fusion between the T1 and T2 vertebral bodies and the animal started a long physiotherapy program. Almost 3 years later the animal was released back into the wild.

Vertebral fractures are not often diagnosed in vivo in wild birds. Vertebral anatomy and species-specific differences in number, form, and pneumatization make radiographic diagnosis difficult. A good neurological examination allows lesion localization and reduces exposition to radiation. Conservative management of some vertebral fractures may be possible in compliant patients and hence the possibility of returning to the Wild.

Keywords: Vertebral fracture, spinal trauma, Eurasian Griffon Vulture, WIldlife Rehabilitation Centre

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Vultures' foraging network: a century-old hypothesis investigated with radar

Numerous vultures coming from every direction, falling from the sky in large numbers and aggregating around a carcass is a mesmerising sight. For this phenomenon to occur, it has been hypothesized that two things are required. First, the local enhancement, a social cue due to a vulture's sharp loss in altitude that conspecifics can rely on to locate unpredictable carrions. Second, the use of a social foraging strategy where individuals spatially distribute themselves in order to form a network in which the interindividual distance allow them to keep an eye on their flying conspecifics. This network foraging strategy has been first formulated by Tristram in 1867, but never measured empirically, because of the technical difficulty to record simultaneously the positions of several tens of vultures flying at high altitudes. To overcome this challenge, we used a radar to track all birds flying simultaneously into a 6 km radius during 33 days. In parallel, around 2300 tracks were annotated by direct field observation where the species and flight height was recorded. This sample of annotated tracks was used to train a machine-learning algorithm in order to probabilistically annotate the rest of the dataset. We will present here the first results of this experiment, regarding whether Griffon Vultures (*Gyps fulvus*) movements reveal a coordinated pattern.

Keywords: hierarchy, movement decision, landscape exploration, social information, step selection function, unpredictable resource

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1 - Max Planck Institute of Animal Behaviour

The Drylands project

Drylands are expanding, and enhanced warming and rapidly growing human population are exacerbating the risk of land degradation and aridity across the globe. Vultures are large scavenging birds and characteristic species of the arid and mountainous regions worldwide; the combination of their diet and locomotory requirements makes them ideal indicator species to track ecological change on the landscape level.

Vultures are closely dependent on large herds of herbivores in drylands, where dying of thirst is one of the most common causes of mortality for large mammals. While ungulate herds "surf the green wave", vultures feed on large mammals' carcasses and are therefore expected to track their presence in areas, or times, of increased dryness. To test this hypothesis and to understand the dependence of vulture movement from the availability of water and grasslands, we rely on a collection of data offered by the members of the *Vulture Research Consortium* (VRC). Thanks to the contribution of 30 data owners, we gathered GPS data from over 1600 birds from 16 vulture species (out of 23 extant species) across all continents, tracked between 2006 and 2023. Using these data, we calculated metrics of daily movement patterns and related them to changes in NDVI, a known proxy for wetness and greenness, across different spatio-temporal scales.

This study is part of a bigger project, the *Drylands project*, which aims at studying the relationships between vulture communities and drylands at global scale. Vultures occupy the top of the trophic pyramid and are prime candidates to show and observe changes in ecological and environmental dynamics. We thus hope that the results of this project will bring us closer to understand how changes in vultures' movement patterns could be used as an early warning system to track environmental changes at the landscape level.

Keywords: drylands, consortium, daily movement, greenness, climate change

Poster presentation

Lovelater Sebele[1]

1 - BirdLife International

Implementing Vulture Safe Zones: lessons from Southern Africa

The concept of Vulture Safe Zones was developed in Asia in an effort to create safe areas for vultures after populations had suffered a significant decline from exposure to diclofenac. Vultures in southern Africa are faced with more threats, including poisoning, belief-based use, electrocutions and collisions and habitat loss. Although most vultures in southern Africa nest within protected areas (with some level of protection), there are some that nest within private farms and communal areas. Thus, there is a need to engage landowners and communities in these sites to ensure their activities promote the continued existence of these vultures. From 2017 to date, BirdLife partners have established Vulture Safe zones in three countries in the region. These have been established in private game farms, dairy farms and communal land. Working in different land use types presents different challenges and opportunities. To ensure that the same standards are followed in establishing Vulture Safe Zones, regardless of the land use in the area, the BirdLife partners in Asia and those in southern Africa have developed guidelines for establishing Vulture Safe Zones.

Keywords: Threats, Vulture Safe Zone, Vulture Support Groups, Guidelines

Poster presentation

Mohammed Shobrak[1]

1 - National Center for Wildlife

Body temperature of Lappet-faced Vulture' nestlings *Torgos tracheliotus* in the natural environment

Desert birds often face harsh conditions in their environment, characterized by intense solar radiation, temperature extremes, low primary productivity, and scarcity of drinking water. Among these species is the lappet-faced Vulture nestlings, which hatched in late February, and stay for nearly 4-5 months until it fledged at nest build at the top of tree. This makes the nestling vulnerable to the effect of direct sunlight, with maximum temperature could reach 65 oC. In this study the body temperature (Tb) of eight lappet-faced vulture nestlings were investigated under the natural condition, to understand the impact of climate on survival of vulture nestlings. Two types of devices were implemented in abdominal cavity of nestlings after been calibrated and coated with biologically inert wax (Paraffin/ Elvax) before implanted of each nestling. Five temperature-sensitive radio BD-2 from Holohil Systems Ltd, and three temperature TidbiT data loggers from Onset computer corporation-USA. comparing the results of calibration of the two types of devices before and after, found large changes in the temperature-sensitive radio, whereas the data loggers showed +0.1 OC only, which probably presenting the closes figure for the actual Tb of the nestlings. The results of data loggers showed that there is a significant difference in the Tb at different time of the day F= 593.704; P<0.001 with average Tb 39.1 OC, SD + 0.67 OC, with a minimum degree of 35.1 OC, recorded at 19: 10 of 11th April, when ambient temperature (Ta) was 24. 83 oC April, after heavy rain, and maximum Tb was 42.3 OC in June. The daily difference of Tb between the minimum and maximum was 2.002 OC, SD= +0.73. To predict (Tb oC). Using the Pearson correlation equation coefficient shows that the Tb is still under the critical temperature, which suggests that the species have adapted to this harsh environment.

Keywords: Body temperature, Lappet-faced Vultures, Desert birds

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Vultures Conservation Status in Saudi Arabia

In Saudi Arabia, seven species of vultures were recoded; four are breeding, one is winter visitor and two are vagrants. The breeding population are Lappet-faced, Griffon, Egyptian and Bearded vultures, whereas the Cinereous Vulture is a wintering visitor in most of the central and northern part of the country. Among these vultures the lappet-faced vulture was the most studied species in the kingdom with the main objective to determine the biology and threats affecting the population. Results showed fluctuating on the number of nesting pairs during 30 years of monitoring with changes in the nests' distribution from concentrated on one area to be scattered around the reserve. Egyptian Vulture, observations showed decline on the breeding and Migrant populations and studies identified a congregating site for the migratory species with more 200 birds. Observations at two studied areas showed a different breeding success between the two sites. At king Salman royal reserve, in the north-central of Saudi, 42 nests were located, with 22 active nests, whereas in Tanumah area in the southwest of Saudi Arabia, 38 nests were located between 2016-2021, only 6 nestlings fledged. Tagged vulture at neighboring country found breeding in Tanumah colony suggest a possibility of Metapopulation occur among the Griffon Vultures' populations in the region. The Bearded Vulture probably extinct as breeding residence with the last record was from the northern of the kingdom in 1997. The threats investigation showed that poising, electrocution & collision with powerline, egg predation and disturbance at nesting site presenting the main threats for the vultures' species in Saudi Arabia. Vultures' conservation actions were implemented with isolation of some dangerous powerlines, legislation, establishment of the special forces for implementing of regulations and by increase the protected areas from 4.3% of terrestrial areas to 16.86% in 2016 and hopefully to 30% by 2030.

Keywords: Lappet-faced Vulture, Bearded Vulture, Griffon Vultures, Cinereous Vulture Saudi Arabia

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When green energy jeopardizes the conservation of threatened species: Cumulative effects of industrial wind farm development on the Cinereous and Griffon Vulture in Thrace, NE Greece

Wind farms are considered as part of the solution in the process of climate change mitigation. However, prioritizing green energy generation within protected natural areas induces the paradox of enhancing biodiversity loss. Thrace, in northeastern Greece, is recognized as one of the most important Balkan strongholds for the survival of three threatened vulture species that use the area for nesting, foraging and roosting. Yet, a large part of it was designated as a priority area for wind farm development, jeopardizing vulture populations across borders. Current installed and licensed capacity consists of 767 MW in 350 turbines, while future plans foresee another 934 turbines of 3881 MW approximately. We combined range use (extensive telemetry datasets) with collision risk models for the Cinereous and Griffon Vulture, estimating the cumulative current and future collision mortality, and quantified displacement under the current installed capacity. For the current capacity, we predict 8.15 Cinereous and 15 Griffon Vulture collisions annually, under a 98% avoidance rate. With only 10 - 18% of the planned wind turbines approved, the estimated mortality would still account for substantial annual population losses of 13-16 Cinereous and 17-18 Griffon Vultures. Also, severe displacement of the Cinereous Vulture caused by the operating wind farms was found. The use of the area around operating wind farms (buffer of 200 m) declined by 85-89 %, in 36-57% of them, depending on the season (breeding and non-breeding). This displacement effect was more pronounced around wind farms with installed Automatic Shut Down Capability Systems. Griffon Vultures did not seem to be displaced by operating turbines. The cumulative effects are far too high to be absorbed by the populations of vultures in this transboundary area, imperiling their conservation targets. It is thus imperative that further wind farm development in vital vulture areas should be curtailed and monitored carefully.

Keywords: threaten species, telemetry, wind turbines, cumulative collision, displacement

Francisco Soler Rodriguez[1]; David Fernández Casado[1]; David Ocampo Martin[1]; Marcos Pérez López[1]; María Arredondo Lima[2]; Andrea Beltrán Fernández[2]; María Galán Carrillo[2]

1 - Laboratory of Toxicology, Veterinary Faculty, University of Extremadura (Spain); 2 - GEPEX A.T., Dirección General de Sostenibilidad, Centro de Recuperación y Conservación ex-situ de Fauna "Los Hornos", Junta de Extremadura (Spain).

Poisoning in three vulture species in Extremadura (Spain) 2002-2022

Poisoning in wildlife has been an obvious issue for many years. In this study, we compile and analyse data collected from 2002-2022 in our Toxicology Diagnostic Laboratory in three vulture species: Griffon Vulture (*Gyps fulvus*), Black Vulture (*Aegypius monachus*) and Egyptian Vulture (*Neophron percnopterus*). Birds were submitted to our lab from the Wildlife Recovery Centers in Extremadura (Spain) for the analysis of suspected poisoning due to an Agreement with the regional authority (Junta de Extremadura).

Samples (stomach, liver and brain) from griffon (n=193) and black (n=133) vultures were analysed and the presence (at toxic levels or not) of chemicals were detected in 95 (49.22%) and 56 (42.1%) specimens, respectively. Poisoning was confirmed in 35.88% of the total due to carbamate and organophosphate pesticides. The most used compounds were carbofuran (n=47), chlorfenvinphos (n=28) and aldicarb (n=12). Other detected toxicants were carbaryl (n=11, 9 of them from the same case), dimethoate+fenthion (n=5, all of them from the same case), fenamiphos, chlorpyrifos and oxamyl (n=4 each one), thiodicarb, parathion, malathion, metamidophos, diazinone, coumaphos and monocrotophos (n=1). In a Black Vulture, a mix of aldicarb, carbofuran and chlorfenvinphos was detected. In 22 specimens, a significant brain AChE inhibition was observed but the chemical analysis was negative. The analysis of anticoagulant rodenticides was implemented since 2014, and although residues has been detected in liver of several specimens, only a Black Vulture showed to be poisoned (bromadiolone and brodifacoum exceeding the diagnostic threshold >200ppb in liver).

Samples from 14 Egyptian Vultures were tested and 7 (50%) were poisoned: 6 with carbofuran and 1 with aldicarb.

The impact of poisoning on these birds is estimated to be higher, as in some cases samples were considered insufficient or unfit for testing. A negative temporal trend is observed in the diagnosis of poisoning during this period.

Keywords: vulture, Extremadura, poisoning, pesticides

Caterina Spiezio[1]; Miriam Vadalà[2]; Giuseppe Alampi[1]; Camillo Sandri[1]

1 - Parco Natura Viva - Garda Zoological Park; 2 - University of Milan

Behavioral observation as tool to improve the knowledge of lesser known vulture species

Sarcogyps calvus is listed as critically endangered in the IUCN (International Union for Conservation of Nature) Red List of endangered species as the population is facing a rapid reduction, which is likely to continue into the near future. Parco Natura Viva is the only European zoo hosting this species. From 2013 to 2018, a total of twelve eggs were laid and 11 were placed into the artificial incubator. From them, nine red-headed vulture chicks were born. In 2020 and 2021 two chicks were born and raised by their parents. According to our study, the incubation period ranged from 54 to 57 days (average incubation: 55.7 days) with both artificial and natural incubation. This finding adds to recent literature on wild red-headed vulture, reporting an incubation of approximately two months, although previous investigations reported an incubation period of 45 days. In addition, a behavioural study has been started to describe the behavioural repertoire of this species. This study gives new insights into the breeding biology of zoo animals, underlining the importance of ex-situ conservation for species survival as well as to improve our knowledge on their biology and behaviour.

Keywords: *Sarcogyps calvus*, parent care, critically endangered

Katherine Steinfield[1,2]; Ryan Felice[1]; Mackenzie Kirchner[3]; Andrew Knapp[2]

1 - University College London; 2 - Natural History Museum London; 3 - University of California Berkeley

Carrion converging: Skull shape is predicted by feeding ecology in vultures

The link between skull shape and dietary ecology in birds at macroevolutionary scales has recently been called into question by analyses of 3D shape that reveal that cranial anatomy is mainly influenced by other factors such as allometry. It is still unknown whether this form-function disconnect also exists at smaller evolutionary scales, for example within specialized ecological guilds. Vultures are a diverse guild of 23 extant species in two families (Accipitridae and Cathartidae) that exhibit phenotypic convergence as a result of highly-specialized feeding ecology. Vultures are the only known obligate scavengers among vertebrates and are usually grouped together under this single dietary category, but within this specialized diet there are three distinct, species-specific feeding strategies termed ripper, gulper, and scrapper. We use three-dimensional geometric morphometrics to quantify the relative contributions of feeding ecology, allometry, and phylogeny on vulture skull shape, along with several non-vulture raptors of similar size, range and ecology. Families show clear separation in shape, but phylogenetic signal is comparatively weak (Kmult = 0.33). Taking into account the influence of phylogeny, skull shape is not significantly correlated with either skull size or feeding type, but there are examples of strong, significant convergence and parallel shape evolution across feeding groups. Furthermore, skull shape performs strongly in predicting feeding ecology in a phylogenetic discriminant function analysis. These findings highlight the importance of detailed assessment of feeding behavior in studies of ecomorphology, rather than broader dietary categories alone, and reveal that ecology can be readily inferred from form given appropriate information.

Keywords: skull shape, geometric morphometrics, ecomorphology, convergence, feeding ecology, paleontology, phenotypic evolution

Poster presentation

Katherine Steinfield[1]; Helen O'neill[2,3]; Sarah Durant[4]

1 - University College London; 2 - Durrell Institute of Conservation and Ecology; 3 - University of Kent; 4 - Zoological Society of London

Dead serious: 40 years of vulture monitoring in Serengeti National Park

Globally, vultures are in decline due to persecution and environmental change, however few studies have assessed long-term changes in African vulture populations. This study uses 40 years of carnivore hunting data from the Serengeti National Park, Tanzania to investigate long-term population trends by analyzing vulture arrivals at carcasses. Anthropogenic influences on vultures are assessed via proximity to the park boundary. We found statistically significant declines in four vulture species since the 1990s as well as overall decline for the guild since the 1980s. Vulture abundance at carcasses was not correlated with distance to the park boundary, with the exception of White-backed vultures which declined in abundance closer to the boundary. Overall, vultures were less likely to be detected at carcasses closer to the edge of the park. These findings suggest multi-decadal decline and highlight the vulnerability of African vulture populations, even in large, well-managed, protected areas.

Keywords: protected areas, monitoring, population decline, detection, abundance, long-term studies

Aleksandra Szurlej-Kielanska[1]; Dariusz Gorecki[1]

1 - TACTUS

To fly or not to fly in the rotor swep zone? Detection-reaction systems can protect Griffon Vultures against collision on wind farms

Griffon Vultures are known from numerous collisions on wind farms in Spain. Collision incidents occur throughout the year, although most published data on collisions came from the migration period, from southern Spain.

Currently, the development of wind energy poses an even greater threat to individual populations of this species throughout the country. It seems that the factor determining the scale and risk of collision is the way vultures use a given area. The location of important, permanent feeding grounds may determine the high mortality of vultures within farms located in their immediate vicinity, while turbines located in areas occasionally used as feeding grounds or on the route to feeding grounds are not such a big problem.

Based on our ornithological observations made on wind farms in central and northern Spain in 2021 and 2022 and data collected by one of the detection-reaction systems installed on wind farms, we have attempted to define the rules relating to the use of such systems to protect Griffon Vultures against collisions, depending on specias and site specific conditions. As the results of further validation and tests carried out in Poland, Germany and Spain we think that such a systems can be an effective way to minimize the risk of collisions.Technology based on stereovision enabling shutdown the turbines when birds are close to the turbine.

Now we are consulting these assumptions with experts and befriended ornithologists from Spain to be able to implement pilot tests and studies on wind farms located in places with known high activity of vultures.

Keywords: Griffon Vulture, wind farms, protecting Griffon Vultures against collision, detection-reaction systems

Julien Terraube[1]; Franziska Lörcher[1,3,4]; Typhaine Rousteau[2]; Daniel Hegglin[3,4]

1 - Vulture Conservation Foundation; 2 - CEFE-CNRS; 3 – SWILD; 4 – Stiftung Pro Bartgeier

Identifying the main drivers of young Bearded Vulture movements in three European subpopulations

Understanding the drivers of movement in threatened species has crucial implications for their conservation at different spatial scales. The increased availability of high-resolution tracking data offers novel opportunities to identify sensitive dispersal strategies potentially associated to high-mortality risk and how they vary between and within individuals across life-stages. Importantly, numerous threatened species are nowadays dependent on ex-situ conservation programs, yet the effect of captive breeding on the movements and fitness of reintroduced individuals remain poorly understood.

One of those species, the Near Threatened Bearded Vulture (*Gypaetus barbatus*) has partly recovered in Western Europe thanks to intensive conservation efforts, including ongoing reintroduction programs in several mountain areas. However, the effect of captive breeding on Bearded Vulture movements subsequently released in the wild remains poorly understood. Previous studies have shown that reintroduced populations have different movement patterns than wild ones, with shorter movements among the wild Bearded Vultures. Further research is needed to understand the effects of age or release site on Bearded Vulture movements depending on their status (captive bred or wild hatched).

Here, we take advantage of long-term GPS data from 137 Bearded Vultures tagged between 2007 and 2021 across 3 different regions: Alps, Corsica, and Massif Central, to fill this knowledge gap. We estimated several movement parameters such as mean hourly distance travelled, maximum displacement, cumulative distance travelled and core home range size in relation to: i) sex, ii) age, iii) region, iv) 'captive-bred' versus 'wild-hatched' status and v) origin of released birds (i.e. breeding centres). Our study identified the existence of age- and region-dependent movement strategies and potential effects of status on such movements. These results have important implications for targeted conservation actions aimed at restoring Bearded Vulture populations across Europe.

Keywords: dispersal behavior, conservation, movement ecology, reintroduction, tracking technology

Poster presentation

Evelyn Tewes[1]; Jose Manuel Tapia[2]

1 - VCF; 2 - MWF

Status of vulture populations on the island of Mallorca (Spain) and measures for their conservation

The following paper presents the evolution and current status of the three species of breeding vultures on the island of Mallorca: Black Vulture (*Aegypius monachus*), Griffon Vulture (*Gyps fulvus*) and Egyptian Vulture (*Neophron percnopterus*). The Mediterranean Wildlife Foundation (MWF) and the Black Vulture Conservation Foundation (BVCF) have been working on the conservation of vultures throughout Europe and specifically in Mallorca for more than thirty years, together with the administration and local NGOs where the project of reinforcement of the Black Vulture population has been a success, going from a breeding pair in the 80s to 45 today.

In the same way, the MWF has been involved in monitoring the Griffon Vulture population after the natural colonization of the island by this species in 2008, carrying out censuses of breeding pairs annually since 2012, when they began to reproduce, counting in 2023 with 25 couples.

The rarest of the vultures present on the island is the Egyptian Vulture with two breeding territories, both in the northeastern part of Mallorca, the area closest to the neighboring island of Menorca where the species is abundant.

In this poster, in addition to the results obtained in the monitoring, the conservation actions carried out by the MWF for the preservation of these threatened species will be described.

Authors: José Manuel Tapia, Evelyn Tewes and Jordi Muntaner

Keywords: *Aegypius monachus*, *Gyps fulvus*, *Neophron percnopterus*, Mallorca, staus, conservation, The Mediterranean Wildlife Foundation

Carlos Torralvo[1]; Alejandro Onrubia[1]; Jorge Garcia-Macia[1]; Miguel Ferrer[2]

1 - Migres Foundation; 2 - Doñana Biological Station, CSIC

First African White-backed Vulture (*Gyps africanus*) tagged with GPS transmitter in Europe: preliminary results

On 3 December 2021, ornithologists of Migres Foundation ringed and GPS-tagged a juvenile White-backed Vulture (*Gyps africanus*), a rare vagrant to Europe and the first one to be ringed and tagged in Europe. The capture and release site was Bolonia (Cadiz), close to the the spanish coast of the Strait of Gibraltar. Between December 2021 to June 2023, this vulture has traveled the entire western half of the Iberian Peninsula, from Cadiz to Asturias, and has established several temporary centers of activity in Andalusia, Extremadura and Portugal, related to rubbish dumps or areas with a high density of domestic livestock. The tagging of these birds will have especially important implications for the knowledge of this sub-Saharan species occasionally found in the Western Palearctic region. Like other species of African vultures (ex. *Gyps rueppelli*), the White-backed Vulture is increasing the records in the Western Palearctic and with the possibility for a potential colonization of the European continent, opening a new scenario for the conservation of these critically endangered species in a context of global change.

Keywords: White-backed Vulture, Gyps africanus, Iberian peninsula

Cécile Tréhin[1]; Olivier Duriez[2]; François Sarrazin[4]; Benoit Betton[5]; Jocelyn Fonderflick[6]; Franziska Lörcher[7]; Etienne Marlé[8]; Jean-François Seguin[9]; Julien Traversier[10]; Noémie Ziletti[3]; Jb Mihoub[4]

1 - INRAE; 2 - Université de Montpellier, Centre d'Ecologie Fonctionnelle et Evolutive; 3 - LPO Grands Causses; 4 - Sorbonne Université, Centre d'Ecologie et des Sciences de la conservation; 5 - Parc Naturel Régional du Vercors; 6 - Parc National des Cévennes; 7 - Vulture Conservation Foundation; 8 - Aster, Conservatoire des Espaces Naturels – Haute-Savoie; 9 - Parc Naturel Régional de Corse; 10 - Vautours en Baronnies

Long-distance post-release movements challenge the metapopulation restoration of Bearded Vultures

Restoring ecological dynamics is a key objective of conservation translocations. Exemplarily, reconnecting the reintroduced alpine populations with native Pyrenean populations through re-establishing locally extinct populations in between, in the Causses and the Pre-Alps, is a major goal for the long-term conservation of Bearded Vultures in Europe. Understanding Bearded Vulture's post-release movements and foraging behavior is critical to understand the settlement of newly restored populations and to support conservation measures. The telemetric monitoring of 43 translocated and wild-born juveniles allowed us to investigate whether differences exist in post-release movements and foraging behavior during the first year of life between reintroduced and native populations. Medium and long-distance exploration movements start during the spring following fledging for both translocated and wild-born individuals. However, birds translocated in the most distant release site (Causses) exhibited greater exploration distances with no clear directional movement pattern, had smaller home ranges and a stronger preference for supplementary feeding stations than those from other populations. Although some birds translocated in the Pre-Alps displayed similar behaviors, the pattern is not as strong as in the Causses, likely because of the proximity to the breeding populations reintroduced in the Alps or of differences in the number and management of supplementary feeding stations. Preference for supplementary feeding stations mostly occurred during winter in the Pre-Alps but was consistent among seasons in the Causses. Beyond documenting post-release movements in Bearded Vultures, we suggest better accounting for the demographic consequences of behaviors to track conservation translocation effectiveness, at both local and regional scales.

Keywords: reintroduction, satellite telemetry, exploration movements, foraging behavior, establishment phase

Poster presentation

Mehmet Ugur Altuncu[1]; Nurben Koptekin[1]

1 - Eskisehir Zoo

Eskisehir Zoo Egyptian Vulture monitoring project

Eskişehir Zoo last years began a project tracking Egyptian Vultures (*Neophron percnopterus*). Eskişehir is an important breeding area for these endangered birds. In April, we were able to attach satellite transmitters to three Egyptian Vultures: Midas, Frig, and Doğa. The satellite transmitter completed the migrations of Doğa and Midas, which were attached, and returned to Eskişehir. Egyptian Vulture Doğa flew 39564 km from april 27th,2022 to may 14th, 2023. And Egyptian Vultures Midas flew 32056 km from april 23rd, 2022 to may 14th, 2023. We are planning to attach satellite transmitters on 4 Egyptian Vultures this year. We will use the data provided by these trackers to determine the habitat requirements of Egyptian Vultures and identify their breeding grounds and migration routes. In the short term, we will work to identify factors affecting nesting success and target conservation efforts that improve these. In the long term, we will work to identify migration routes and determine factors affecting successful migration.

Keywords: Zoo, Egyptian Vulture, Monitoring Project, Eskisehir

Gideon Vaadia[1]; Tal Agassi[2]; Marta Acacio[1]; Nili Anglister[1]; Ohad Hatzofe[3]; Ygal Miller[3]; Patricia Mateo Tomás[4]; Moni Shahar[2]; Orr Spiegel[1]

1 - School of Zoology, Faculty of life Sciences, Tel Aviv University, Israel; 2 - Center of AI and Data Science, Tel Aviv University, Israel; 3 - Science Division, Israel Nature and Parks Authority, Jerusalem, Israel; 4 - Biodiversity Research Institute (University of Oviedo-CSIC-Principality of Asturias), Mieres, Spain

Accelerometer-based remote classification of Griffon Vulture behavior as a conservation tool

Recent anthropogenic changes have led to a rapid decline in vulture populations worldwide, including the Israeli Griffon Vulture (*Gyps fulvus*). Despite significant conservation efforts, including a network of supplementary feeding-stations (SFS) and a real-time alert system, poisoning (both pesticides and veterinary drugs) poses the major threat to vultures in Israel and elsewhere. Thus, the identification of vulture foraging areas and feeding sites is crucial for their conservation. However, observing and detecting in-situ feeding events remains challenging. To address this challenge, we developed a reliable tool for remote identification of behaviors using bio-telemetry data.

To that end, we tagged 125 griffons with GPS/GSM transmitters equipped with tri-axial accelerometers (ACC). We trained a Random Forest algorithm with data from 34 individuals (14 captive, 20 wild) to classify ACC measurements (n=5783) into six behavioral classes: 'Eating', 'Soaring', 'Flapping', 'Lying-down', 'Standing' and 'Ground behaviors'. We first validated the algorithm using data splitting into training/test sets (accuracy=96%, precision=89%). Then, we further validated one of the most heterogeneous classes - Eating, using real-life GPS data demonstrating a precision score of 72-85%.

After validating the algorithm, we used two month-long periods of intensive sampling in different seasons (Fall: n=43, Spring: n=59, 63 unique individuals) to map all non-SFS feeding events in the region and examine seasonal changes in foraging hot-spots. Besides improving the understanding of vultures' feeding ecology, this mapping may be used in sanitation and conservation efforts. Additionally, this classification tool can improve the real-time alert system employed to flag suspicious landing sites for local rangers.

Our study demonstrates the potential of ACC-based behavioral identification as an effective tool for vulture conservation and ecological research. By enabling remote monitoring and providing valuable insights into vulture behaviors, this approach has the potential to contribute to the development of targeted conservation strategies as well as improving real-time response capabilities.

Keywords: conservation, management, bio-telemetry, machine-learning, GPS tracking

João Pedro Valente E Santos[1,2,3]; Fátima Domínguez Gigante[1]; José Pereira[1]; Uliana De Castro[1]; Iván Gutiérrez[1]; Patricia Mateo-Tomás[4]

1 - Palombar – Associação de Conservação da Natureza e do Património Rural; 2 - CIBIO – Centro de Investigação em Biodiversidade e Recursos Genéticos, InBIO Laboratório Associado; 3 - BIOPOLIS Program in Genomics, Biodiversity and Land Planning, CIBIO; 4 - Biodiversity Research Institute, CSIC–Oviedo University–Principality of Asturias

Multi-source data for dealing with conflicts between livestock farmers and vultures: preliminary results from the project LIFE Aegypius Return

An emerging conflict is brewing in Europe since the late 1990s/early 2000s between vultures and livestock farmers. At the root of this conflict are allegations that vultures, in particular Griffon Vultures (*Gyps fulvus*), are now attacking and killing livestock. While it is documented that vultures can feed on animals when they are not yet dead - e.g., if they are immobile - scientific evidence on the frequency and the causes of this conflicting situation is still scarce. The insufficient robust information on this issue severely limits our understanding of the conflict, making it a challenging problem to address effectively. The integrated analysis of data from different sources can offer a complementary approach to improve our knowledge on this complex topic and help in providing recommendations to wildlife managers and other stakeholders on how to deal with this conflict. In this session, we will present preliminary results obtained from analysing data compiled as part of 'Task 5.3 – Baseline study on vulture livestock conflict for targeted prevention and mitigation' of the project LIFE 'Aegypius Return – Consolidating and expanding the Cinereous Vulture population in Portugal and western Spain'. Data from three main sources will be considered: 1) perceptions and attitudes of livestock farmers regarding vultures; 2) complaints from livestock farmers about incidents involving vultures in their farms; and 3) news on vultures and their interactions with livestock. The presentation of the preliminary results of these independent but interconnected studies will be key to generate and guide the discussion among vulture specialists, wildlife managers and administrations at the II European Vulture Conference to find appropriate solutions and strategies to deal with the conflict, thus promoting a better coexistence.

Dimitrios Vavylis[1]; Ioannis Dimitrakopoulos[1]; Aristotelis Ioannidis[1]; Evangelia Karta[1]; Jamie Giannaka[1]; Elpida Grigoriadou[1]; Dionyssia Hatzilacou[1]; Konstantinos Kiriakidis[1]; Athanasios Korakis[1]; Nikolaos Paleos[1]; Savvas Vasileiadis[1]; Ioannis Vergos[1]; Sylvia Zakkak[1]; Konstantinos Zorbas[1]

1 - Natural Environment & Climate Change Agency, Athens, Greece

Dogs in the service of the biodiversity of Greece: the new Antipoison Canine Units of the Natural Environment and Climate Change Agency (N.E.C.C.A.)

Poisoning is one of the major threats to vultures worldwide. In Greece, the use of poison baits has been illegal since 1993 but it's still common practice in rural areas, targeting a variety of wild or domestic animals. This crime has cost the lives of many vultures throughout the years, causing significant population decreases or even local extinctions. Many actions have been taken to fight this crime in the country. Specially trained dogs for poison baits detection have proved to be very effective for controlling this phenomenon. The first trained dogs started operating in Greece in 2014, under the framework of the EU funded LIFE Project "The Return of the Neophron", by the Hellenic Ornithological Society and WWF-Greece, while more dogs were subsequently brought into service by private bodies. The success of these first dogs prompted the Natural Environment and Climate Change Agency (N.E.C.C.A) to obtain seven specially trained dogs (2 Border Collies, 3 Belgian Malinois, 2 German Shepherds) in 2022. Along with their handlers, they constitute the Antipoison Canine Units (A.C.U) of the Agency. These dog units are the first of their kind in the country, owned and managed by a governmental institution and are now recognized as working dogs in the official legislation. The units operate within the area of responsibility of seven Protected Area Management Units of N.E.C.C.A, covering 127 Natura 2000 sites. Some of these areas, like Messolonghi and Nestos, are very important for vultures. In these, the use of poison baits has been documented in the past, while in others, such as Peloponnese, the first findings of the A.C.U operation suggest a previously undetected use of poison baits. Future actions against poison bait use should include further improvements in legislation, clarification of procedures, improvements in currently applied criminal investigation techniques and stricter enforcement of penalties.

Keywords: Poison baits, working dogs, wildlife crime, antipoison actions, threats, Conservation tools

Carlota Viada Sauleda[1,2]; Jordi Muntaner Yangüela[1,2]; Joan Mayol Serra[1,2]

1 - SEO/BirdLife; 2 - Conselleria de Medi Ambient i Territori

First photographic census of Black Vultures and Griffon Vultures in Mallorca

Within the framework of the "Pla Terrasse" for the recovery of birds of prey, the Balearic Islands Government, through SEO/BirdLife, carried out a first photographic census of individuals of Black and Griffon Vultures.

Objective: To learn more about the ecology and demography of these islanders' vultures, and to calculate the floating population of non-breeding individuals and how its relationship with the number of pairs has evolved over the last decades.

Methodology: During 3 days in October 2021, 16 mixed-teams of photographers and ornithologists (68 volunteers) collected photographs of vultures to discriminate them individually, reducing the risk of errors compared to only visual censuses. The principle of capture-recapture was applied.

Results: A population of 332+13 Black Vultures was estimated in Mallorca, and 153+ 23 Griffon Vultures. The results of both censuses were considered coherent with the rest of the data known on the populations and their recent evolution.

A spectacular recovery of the Black Vulture has been verified, particularly since the beginning of the decade of 2010, probably due to the progressive incorporation of the increasingly numerous specimens flown in recent years, added to the likely lower rate of mortality due to decreased unnatural causes, such as poison and gunshots. From the analysis of the floating population, it is evident that the most intense population recovery, from 2010, must have been based on recruitments of the floating population. Although very little is known about the fluctuating balances between breeding and floating rates in raptor populations, the data in the case of Mallorca would indicate that we are dealing with a Black Vulture population with a good capacity for recovery thanks to the existence of a good fraction of floating individuals.

As for the Griffon Vulture, it is progressively expanding since its natural colonization of the island in 2008.

Keywords: Black Vulture, Griffon Vulture, census, individuals, Balearic Islands

Poster presentation

Carlota Viada Sauleda[1,2]; Joan Nicolau Oliver[1,2]

1 - SEO/BirdLife; 2 - Conselleria de Medi Ambient i Territori

Mallorca has the biomass to hold three times the current population of vultures

In the Balearic Islands, scavenger bird populations have recovered remarkably since the 1980s, when protection, monitoring and conservation measures started. There are three species of vultures established in Mallorca and Menorca (*Aegypius monachus*, *Gyps fulvus* and *Neophron percnopterus*), as well as two other species of scavenger birds, *Milvus milvus* and *Corvus corax*.

In addition, the increasing dependence of the Balearic economy on the tertiary sector, at the expense of the primary and secondary sectors, makes it necessary to regularly assess the availability of resources for scavengers. Within the framework of the "Pla Terrasse" for the recovery of birds of prey, the Balearic Islands Government, through SEO/BirdLife, analysed in 2022 the trophic capacity of each island to host vulture populations to determine whether this capacity could be a limiting factor for these species in the future.

The work has been carried out basically on the basis of data on extensive livestock (domestic sheep and goats), as well as on wild or feral animals (feral goats, rabbits and hares).

According to the estimates, the populations of the three vulture species present in Mallorca require 98 MT of biomass annually. It has been concluded that there is currently approximately 319 MT of carrion biomass available annually for vultures on the island of Mallorca, i.e. there are resources for about three times the current vulture population on the island.

In Menorca, the dense population of *Neophron percnopterus* (around 50 pairs) depends on maintaining good rabbit densities, and that domestic sheep survive extensively in Menorca's countryside. Although it is a species with a wide food spectrum, which does not depend 100% on large carrion, as it also takes advantage of small organic remains found in the natural environment.

Keywords: *Gyps fulvus*, *Aegypius monachus*, Balearic Islands, Carrying capacity

Maarten Vis[1]

1 - *none*

Breeding Rüppell's vultures in European zoos

Diergaarde Blijdorp (Rotterdam Zoo) is the coördinator of the EAZA Ex-situ Program for Rüppell's vultures in European zoos. The species is kept in 27 institutions throughout Europe.

Currently there are 133 (73.59.1) birds in this program, which is meant to keep the species in good (genetic) health for possible future reintroductions.

Double clutching and artificial incubation are two practices which are used in the past years to increase the population. Double clutching increases the number of eggs and chances to hatch multiple chicks form a pair. Artificial incubation increases the number of eggs that successfully develop and hatch. Also (foster)parent rearing is used to give the chicks a natural way of growing up. The 2023 breeding season was very successful in means of the number of chicks reared. Usually every year, about 5 chicks hatched during the last 10 years, excluding the ones which died before reaching the age of 6 months. In 2023, 15 in total were hatched, and currently reached the age of 5 months (end September).

The presentation will give an insight in this population management program, and some practical examples of breeding the species in captivity. Keeping a species in captivity is not the only way to conserve species from extinction, but also research and in-situ cooperation is very important. Together with Wageningen University and Research, we perform genetic research on the Rüppell's Vulture genome, and with supporting Peregrine Fund Kenya we're directly contributing to in-situ conservation.

Keywords: Rüppell's Vulture EEP

Toni Wegscheider[1]; David Schuhwerk[1]

1 - LBV

The Bearded Vulture in Germany – results from the first three releases (2021-2023)

The Bearded Vulture was native to the Bavarian Alps, the only mountainous region in Germany, until the 19th century. In 1879, the last known shooting took place in Berchtesgaden. Since 2021, a reintroduction project by Landesbund für Vogel und Naturschutz (LBV) and Berchtesgaden National Park has been attempting to help establish the species both in Bavaria and throughout the eastern Alps. In three releases so far, six Bearded Vultures have been reintroduced into the wild, and the project is scheduled to run until at least 2030. The talk will present the experience gained so far from the local measures, the enormous public interest of the reintroductions in Germany and already recognizable effects on the eastern alpine population.

Keywords: Bearded Vulture, Germany, release, Bavaria, eastern alps

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Mid-term implementation review of the Flyway Action Plan for the conservation of the Balkan and Central Asian populations of the Egyptian Vulture *Neophron percnopterus*

The Flyway Action Plan for the Conservation of the Balkan and Central Asian Populations of the Egyptian Vulture *Neophron percnopterus* (EVFAP) was published in 2016 and began implementation in 2017. Now at the midway point of the 10-year plan, we have reviewed implementation of the Framework for Action.

The review was carried out using the methodology and scoring as set out by Birdlife International. Questionnaires were sent to a focal contact for each of the 33 countries of the EVFAP. Countries scored each of the 59 actions for their Implementation (0-4) and Priority (1-4) which combined to produce an Action Priority Index (API). The National Implementation Score (NIS) was also calculated for each country. Responses were received from 29 countries in total and the NIS ranged from 1.00 to 2.70 with an average of 1.56 for the whole flyway. Countries which were part of the Egyptian Vulture New LIFE project (n=14) had an average NIS of 1.83, showing the value of large-scale projects in delivering conservation measures. Information on updates to conservation and legal status were also collated.

It was determined that in selected countries it was appropriate to use local Priority scores rather than flyway level to produce the API. Certain regions were also invited to score actions which hadn't previously been considered relevant to that region.

Significant progress has been made, but there is still much to be done to complete the overall goal to improve the conservation status of the Egyptian Vulture in the entire FAP range. Notably the highest scoring actions are associated with improved detection, legislation and enforcement surrounding poisoning and the retrofitting/ replacement of dangerous energy infrastructure. We recommend sharing of best practice and methods continues to be encouraged and stakeholders are fully engaged to ensure the ultimate goal of halting the current population declines.

Keywords: Egyptian Vulture, Flyway Action Plan, Implementation Review, Vulture Multi species Action Plan

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Wildfire effects on Cinereous Vulture breeding and habitat use in the Dadia-Lefkimi-Soufli Forest National Park

The Dadia-Lefkimi-Soufli Forest National Park (DLS) Cinereous Vulture (CV) colony hosts 30-36 pairs. The geographic isolation and the very narrow breeding habitat range make the colony extremely vulnerable to stochastic phenomena like wildfires. In summer 2022, ca 4.000 hectares of forest were burnt in the core area of the DLS, reaching 50 meters from one of the CV nests and burning the supplementary feeding station (SFS) infrastructure. In order to assess the wildfire effect on CV breeding success and habitat use, the breeding colony and the birds visiting the SFS were monitored during the fire outbreak. Following spatially explicit fire severity mapping through remote sensing imagery, telemetry data from 15 individuals was analyzed for assessing changes in habitat use within the fire-affected area and flying corridors in DLS. The results indicate that breeding success was not affected by fire spread, even in the case of the nest located within 50m from fire perimeter. The SFS, though burnt, was regularly visited by the vultures during the fire breakout. According to the telemetry data, flying corridors and roosting sites were also not affected. The birds continued using the main corridors between the nesting and feeding sites within the DLS, while overall roosting in the burnt area did not differ significantly after the fire. At a 100m grid scale, 7,4% of the burnt area was used less during the year after the fire, while 11.1% was used more frequently. Small-scale roosting-site shifts were observed around the area of the SFS, where the birds moved 200-400m SW, towards less intensively burnt sites. However, differences in roosting among the three fire severity classes were not significant. Monitoring of habitat use in the subsequent years, will provide a thorough understanding of long-term CV response to fire-induced changes in the area.

Keywords: fire, colony, telemetry, monitoring

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Of vultures and drones: Assessing the potential of Unmanned Aircraft Systems for European vultures research

Vultures are among the most threatened bird guilds on the planet and have a unique functional role within ecosystems. They are therefore subject to increasing research interest, calling for standardised study approaches and monitoring methods. The use of Unmanned Aircraft Systems (UASs) is rapidly gaining popularity in ecological research due to technological advances, affordability, and accessibility. This study reviews the existing peer-reviewed publications and grey literature on the responses of European vultures and other comparable species to UASs, and summarises the types of UAS use, their potential disturbance effects on vultures, and the resulting inter- and intra-specific interactions. Our goal was to assess the potential effects of UASs and to provide practical recommendations to optimise their safe use in vulture conservation and research. We acknowledge the potential of UASs to increase research efficiency and reduce research effort, time, and financial cost. Owing to the absence of sufficient data on long-term disturbance effects, we advocate the precautionary principle and offer a set of species-tailored practical recommendations to limit the potential negative effects of UASs and maximise their value in conservation management. We urge that the physiological and long-term impacts on vulture reproduction are considered and call for standardised monitoring protocols and controls on UAS use. Our conclusions and recommendations are particularly aimed at researchers working on vulture conservation and restoration projects worldwide.

Keywords: vultures, Unmanned Aircraft Systems (UAS), disturbance, impact, *Gypaetus barbatus*, *Gyps fulvus*, *Aegypius monachus*, *Neophron percnopterus*

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Conservation without borders: Bridging the gap for vultures

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