The Gibraltar National Museum

24TH CALPE CONFERENCE

CALPE CONFERENCE 2020

NATURAL HISTORY OF GIBRALTAR:
PAST, PRESENT & FUTURE

PROGRAMME & ABSTRACTS

CONTENTS

CONFERENCE PROGRAMME

Thursday 15th October

09:10 **Welcome by Prof Catherine Bachleda**
Vice-Chancellor, University of Gibraltar

09:15 **Official Opening by The Hon Prof John Cortes**
Minister for Education, the Environment, Sustainability, Climate Change, Heritage and Culture, HM Government of Gibraltar

09:30 **Leslie Linares**: **An overview of the changes in the vegetation of Gibraltar and its effects on particular plant species.**
Gibraltar Ornithological and Natural History Society

10:30 *Tea & coffee break*

11:00 **Andrew Gdaniec**: **In-situ and ex-situ research and conservation of cacti at the Gibraltar Botanic Gardens.**
Gibraltar Botanic Gardens & University of Reading

12:00 **Nigel Taylor**: **Singapore Botanic Gardens and its heritage values.**
Gibraltar Botanic Gardens

13:00 *Lunch break*

14:30 **Geraldine Finlayson**: **Digital photography:**
The new method of natural history collecting in museums.
Gibraltar National Museum, Liverpool John Moores University & University of Gibraltar

15:30 **Rhian Guillem**: **The Ants of Gibraltar:**
With reference to the history of myrmecology in Gibraltar.
Gibraltar Botanic Gardens & Gibraltar Ornithological & Natural History Society

16:30 *Tea & coffee break*

17:00 **Keith Bensusan**: **Diversity and Lives of Insects in Gibraltar.**
Gibraltar Botanic Gardens & Gibraltar Ornithological & Natural History Society

18:00 *Discussion*

Friday 16th October

09:30 **Alex Menez**: **"I am going on gradually with my Fauna Calpensis":**
A miscellany of the history of natural history in Gibraltar.
University of Gibraltar

10:30 *Tea & coffee break*

11:00 **Geraldine Finlayson**: **The Gorham's Cave Complex:**
An ecological overview of a World Heritage Site.
Gibraltar National Museum, Liverpool John Moores University & University of Gibraltar

12:00 **Stewart Finlayson**: **The Pleistocene avifauna of Gibraltar.**
Gibraltar National Museum & University of Gibraltar

13:00		*Lunch break*
14:30	**Keith Bensusan**:	**30 Years of Bird Ringing in Gibraltar** Gibraltar Ornithological & Natural History Society
15:30	**Clive Finlayson**:	**Bird migration in the Strait of Gibraltar - flyways, bottlenecks and stop overs:** *I Terrestrial and aquatic species.* Gibraltar National Museum, University of Toronto, Liverpool John Moores University & University of Gibraltar
16:30		*Tea & coffee break*
17:00	**Tyson Lee Holmes**:	**Bat Research and Conservation in Gibraltar:** *Its history, current projects and a look to the future.* The Gib-Bats Project, Gibraltar National Museum & University of Gibraltar
18:00		*Discussion*

Saturday 17th October

09:30	**Darren Fa**:	**Humans and their relationship with the sea:** *With special reference to Gibraltar.* University of Gibraltar
10:30		*Tea & coffee break*
11:00	**Clive Finlayson**:	**Bird migration in the Strait of Gibraltar - flyways, bottlenecks and stop overs:** *II Coastal and pelagic species.* Gibraltar National Museum, University of Toronto, Liverpool John Moores University & University of Gibraltar
12:00	**Stephen Warr**:	**Gibraltar Marine Reserve:** *Recent advances in surveillance monitoring.* HM Government of Gibraltar & University of Gibraltar
13:00		*Lunch break*
14:30	**Lewis Stagnetto**:	**Understanding annual changes in phytoplankton community structure:** *What are the factors driving these changes in the Strait of Gibraltar?* The Nautilus Project & University of Gibraltar
15:30	**Liesl Mesilio**:	**The Changing Tides of Conservation Policy.** HM Government of Gibraltar & University of Gibraltar
16:30		*Tea & coffee break*
17:00	**John Cortes**:	**Gibraltar – A Conservation Overview** HM Government of Gibraltar & University of Gibraltar
18:00		*Discussion & Closing*

LESLIE LINARES

An overview of the changes in the vegetation of Gibraltar and its effects on particular plant species.

LESLIE LINARES[1]

[1]*Gibraltar Ornithological & Natural History Society, Gibraltar*

Abstract

The vegetation of Gibraltar has undergone many changes over the centuries. These changes have been largely due to the direct action of man in some way or another. In some cases these changes have resulted in positive outcomes whilst others have had a detrimental effect, especially changes due to the introduction of exotic species. Some of these changes can result, and have resulted in the local extinction of native species. This presentation will deal with an overview of the changes that have taken place in various habitats around the Rock since the late 1800s, and the effects that these changes have had, and are having, on habitats, and on particular plant species.

Bio

Leslie is a retired Physics teacher. He is currently Chairman of the Gibraltar Photographic Society, having served as Secretary for 45 years, and an Associate of the Royal Photographic Society. He heads the Botanical Section of Gibraltar Ornithological and Natural History Society and has studied and photographed Gibraltar's vegetation and plants for around 40 years. Leslie was awarded the British Empire Medal in 2013 for his contribution to photography and botany in Gibraltar.

ANDREW GDANIEC

In-situ and *ex-situ* research and conservation of cacti at the Gibraltar Botanic Gardens.

ANDREW GDANIEC[1,2]

[1]*Gibraltar Botanic Gardens, Gibraltar*
[2]*University of Reading, United Kingdom*

Abstract

Cacti are one of the few major plant groups that have been surveyed by the world's experts for their conservation status. Some 1400 species have been assessed using IUCN's Red List criteria and a significant number have been accorded a category of threat. Visiting many cactus habitats throughout the Americas reveals the many kinds of impacts that affect these plants at an ever-increasing rate. Even though many species are naturally found in relatively barren environments where agriculture cannot easily be practiced, other factors come into play. Essential parts of a species' ecological support, such as pollinators, fruit/seed dispersers and nurse plants for seedling establishment, can be displaced, affecting the ability of the species to recruit new individuals or causing catastrophic soil erosion, often following over-grazing by goats and attacks by novel invasive species, pests and diseases. Last, but not least, climate change is eliminating cactus species that live at the very edge of survival, by the shifting of weather patterns, rising temperatures at mountain tops, sea level rise affecting littoral species and increased frequency of destructive hurricanes (Caribbean). Given these challenges it becomes increasingly important to establish *ex situ* refuges for these plants, always in the hope that they may be one day reintroduced to nature, though this may not be possible. Conserving these plants *ex situ*, such as is happening at the Gibraltar Botanic Gardens, is one way forwards, but ideally we also want to do this in the countries of origin. This presents another raft of challenges, including a lack of local resources, expertise and know-how, requiring training programmes, workshops and general encouragement of staff who may lack confidence. At home in Gibraltar we are also making innovations in our cultivation and propagation techniques, such as the use of lava as a substrate and grafting to speed up the development of slow-growing or hard-to-cultivate taxa. These innovations should allow us to harvest seed from controlled pollination of wild-provenance material for inclusion in a seed bank. While acquiring such material in nature it is also important that we take the opportunity to monitor the conservation status of species, as the situation of many is changing rapidly, so we need to be ready to bring more into the safety of our protected collections. This also requires networking across the many sources of expertise, as none of us has all the answers.

Bio

Andrew has been passionate about succulent plants since an early age and has spent much of my life working to develop knowledge on this group of plants. He continued to pursue his passion throughout his formative years and went on to study Botany at Gdansk University, Poland. In 2006, he moved to the UK to blend his scientific studies with practical horticulture. He followed study programmes to help develop his horticultural skills in a botanic setting, first at Birmingham Botanical Garden and then at the Royal Botanic Gardens, Kew, where he completed the Kew Diploma in Horticulture. These experiences really crystallized Andrew's hopes to be actively involved in professional plant cultivation as a technically sound horticulturist with a good science background, to facilitate botanical research. In 2013, he became Curator of the Gibraltar Botanic Gardens (GBG). Recently, the succulent plant programme at GBG led by him has become increasingly involved in the cultivation and conservation of Caribbean cacti. In 2018, Andrew started a PhD at the University of Reading, the subject of study being: 'Systematics, biogeography, reproductive biology and conservation status of *Pilosocereus* (Cactaceae) in the Caribbean and Andean regions'.

NIGEL TAYLOR

Singapore Botanic Gardens and its heritage values.

NIGEL TAYLOR[1]

[1]*Gibraltar Botanic Gardens, Gibraltar*

Abstract

Whilst the presentation unusually for this symposium is not primarily about Gibraltar, the presenter will begin by explaining his connexion with Gib due to a decision by the UK Government in the year 2000, which resulted in his subsequent move from the Royal Botanic Gardens, Kew (UK) to the Singapore Botanic Gardens in 2011. There is also a series of similarities between Singapore and Gibraltar, which the presenter has noticed since his arrival in Gib on 15 August this year. However, the connexion just referred to concerns UNESCO's World Heritage Convention, both countries having a single Site inscribed on to the WH List. The body of this talk will focus on the qualities the Singapore Botanic Gardens (SBG) has that made it a WH Site, its history as a colonial botanic garden, its influence on the early economy of Singapore and SE Asia, its social history for Singapore's residents over the last 160 years, its scientific contribution to the biodiversity of SE Asia and, lastly, the process of securing Singapore's World Heritage Bid. In a densely populated island city-state where urbanisation has been driven by an exceptionally vibrant economy, SBG has had a remarkable influence on the history of the country and its people, which explains how it has survived more or less intact for 160 years despite acute shortages of land and the unrelenting pressures of economic development. It has even grown in surface area during recent years as Singapore's Government has assigned additional parcels of land to the Gardens' boundaries and given it a large degree of direct control over the WH Buffer Zone that protects it from undesirable external developments. SBG can justly claim to be the world's most visited botanic garden, which in pre-COVID times had reached nearly 6 million visits per annum.

Bio

Dr Nigel Taylor, 64, began his botanic gardens career at the Royal Botanic Gardens, Kew (UK) in 1977. In 1995 he was made Curator, responsible for the Gardens' horticulture and latterly also public education. Between 2000 and 2002 he worked with consultants in developing Kew's UNESCO World Heritage bid at the behest of the UK's Govt, which status was achieved in June 2003. This indirectly led to his appointment as Director of the Singapore Botanic Gardens in 2011, where he worked until his retirement in December 2019, helping to inscribe those gardens on to the UNESCO WH List in 2015. Since August this year he has been working at the Gibraltar Botanic Gardens on a variety of projects, but most especially helping to develop its collection of cacti as a research tool and germplasm bank for the *ex situ* conservation of some of its threatened species. Dr Taylor has published 10 books and more than 300 other studies ranging from botany and conservation to garden history. He is also a Chartered Horticulturist, with a deep love of growing plants.

GERALDINE FINLAYSON

Digital photography:
The new method of natural history collecting in museums.

GERALDINE FINLAYSON[1,2,3]

[1]*Gibraltar National Museum, Gibraltar*
[2]*Liverpool John Moores University, United Kingdom*
[3]*Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

Photography has been employed in scientific research almost from its very beginnings, and as digital photography developed, the quality of the images that are produced, their resolution and the speed at which these photographs can be taken has revolutionized the possibilities of data collection for nature studies in the field.

Collections are a vital element of any museum, and from the very start, animals have been collected for scientific research. The ethical concerns and general reluctance today of killing animals for these purposes, have been growing issues that have led to many debates on whether this can ever be justified.

This paper attempts to identify to what degree the killing of animals for museum collections can be acceptable. It then looks at photography, and specifically is rise with the advent of digital technology, as a real alternative for museums.

By looking at the collection methods that were used by the 19th and early 20th century naturalists, and comparing them to methods and technology that is available today, it will explore the degree to which digital photography can replace the collection of live specimens.

Bio

Geraldine has been an active researcher for over thirty years, during which time she has authored or co-authored over sixty peer-reviewed publications, and has presented over thirty papers at international conferences.

Her PhD thesis awarded by Anglia Ruskin University was 'Climate, Vegetation and Biodiversity – a multiscale study of the south of the Iberian Peninsula.' Geraldine's research has continued to focus on the spatio-temporal distribution patterns of vegetation and animals, and the relationships between climate, vegetation landscape features and biodiversity.

Dr Geraldine Finlayson is the Managing Director and Director of Heritage and Environmental Services at the Gibraltar National Museum, and World Heritage Site Coordinator of the Gorham's Cave Complex UNESCO World Heritage Site, Gibraltar. She is Adjunct Professor at Liverpool John Moores University and a Research Fellow at the University of Gibraltar.

Geraldine is co-director of the excavations at Gorham's Cave Complex where she has been researching its wildlife for over forty years. As a bio-geographer whose main work has focussed on the influence of climate on vegetation and bird distribution, she also has an interest in Neanderthal behaviour and has published widely in these fields. A keen nature photographer, she has used her images to support her research.

As Director of the Underwater Research Unit (URU), Geraldine (who is an Advanced Diver and Open Water Instructor) has developed, together with research colleagues, an adaptation of 'The Gibraltar Method' which has become central to the study and protection of submerged heritage.

RHIAN GUILLEM

The Ants of Gibraltar:
With reference to the history of myrmecology in Gibraltar

RHIAN GUILLEM[1,2]

[1]*Gibraltar Botanic Gardens, Gibraltar*
[2]*Gibraltar Ornithological & Natural History Society, Gibraltar*

Abstract

Much work on the ants of Gibraltar has been carried out in the past 13 years, with a confirmed 59 species recorded so far from the Rock. Prior to this, the only entomological publications present for the Campo de Gibraltar, including Gibraltar itself, date back to the late 1880s. Two key players were J.J. Walker, a British entomologist who was stationed in Gibraltar from 1886-89 and collected many insects, both on the Rock and the surrounding Spanish hinterland, and Edward Saunders who subsequently identified all of Walker's ant material. What has changed in the last 130 years and what can we deduce from these old records? This talk will discuss what we currently know about the myrmecofauna (ants) of Gibraltar, with emphasis on new discoveries, special species and their life history and ecology, but also touching upon invasives and the potential damage they can cause.

Bio

Dr Rhian Guillem works at the Gibraltar Botanic Gardens as a Technical Officer, where she has held this position since 2014. Her background is in the biological sciences with an MSc in Ecology, Evolution and Conservation from Imperial College. She was awarded a PhD in myrmecology from the University of Sheffield in 2014, with her thesis focussing on the chemotaxonomy of ants. She is primarily an entomologist, specialising in the taxonomy and faunistics of European and Mediterranean ants, in particular the myrmecofauna of Morocco and Spain, but also works on other Hymenoptera groups. She also specialises in invasive mosquito species within Gibraltar. She is an active member of the Gibraltar Ornithological and Natural History Society (GONHS), and is head of the Invertebrates section.

KEITH BENSUSAN

Diversity and Lives of Insects in Gibraltar

KEITH BENSUSAN[1,2] & CHARLES PEREZ[1,2]

[1]*Gibraltar Botanic Gardens, Gibraltar*
[2]*Gibraltar Ornithological & Natural History Society, Gibraltar*

Abstract

The insect fauna of Gibraltar was first studied during the Victorian period, when there was a large boom in people studying insects. Some important information was published from Gibraltar and pioneering work on the insects of southern Spain was conducted from The Rock. Over a century later, Gibraltar still has many of the insects that were recorded in the 19th Century. We introduce the diversity of insects in Gibraltar and highlight the factors that influence species richness on the Rock, as well as discussing the importance of different areas of Gibraltar for insects. We also discuss the entomological work that takes place here. We finish by highlighting the life histories of a range of beautiful and interesting insects from Gibraltar that highlight the incredible diversity that these fascinating animals represent.

30 Years of Bird Ringing in Gibraltar

KEITH BENSUSAN[1] & CHARLES PEREZ[1]

[1]*Gibraltar Ornithological & Natural History Society, Gibraltar*

Abstract

Placing a small, light-weight ring on a bird's leg enables that individual to be identified if captured or found subsequently. Thus, bird ringing has been used to study birds through time; resident and migratory. In Gibraltar, the technique was initially employed by MOD personnel visiting the Rock from the UK, but it was eventually taken on by local ornithologists. Such ringing took place throughout the 1980s, but in the early 1990s, GONHS acquired its Jews' Gate Field Centre in the Gibraltar Nature Reserve, and a regular bird ringing programme has been in place since then, during the spring and autumn months when most of the migration takes place. The programme focusses mainly on songbirds. The data available are thus considerable and allow us to investigate the journeys that migratory species make: where they come from on arrival to Gibraltar, and where they travel to from Gibraltar. They also allow us to contrast visual observations with captures for different groups of birds. A databank of such a size allows for the possibility of many studies and we explore some of the questions that can be posed. Finally, we discuss the future of bird ringing, in Gibraltar and elsewhere.

Bio

Dr Keith Bensusan has been working at the Gibraltar Botanic Gardens since 2007 and became its Director in 2011. He is also General Secretary of the Gibraltar Ornithological & Natural History Society (GONHS). Keith's background is in the biological sciences and he has a broad knowledge of terrestrial natural history, most notably plants, insects and birds. His PhD, which he obtained from the University of Leeds, is in avian ecology. In addition to his work and role with GONHS, he is a member of five statutory bodies in Gibraltar: the Nature Conservancy Council, the CITES Scientific Authority, the Gibraltar Port Authority, the Development and Planning Commission (as GONHS nominee) and the Heritage and Antiquities Advisory Council. Keith's key interests include migration ecology, the diversity, ecology and conservation of species and habitats in Gibraltar, and the succulent flora of Morocco.

ALEX MENEZ

"I am going on gradually with my Fauna Calpensis": *A miscellany of the history of natural history in Gibraltar.*

ALEX MENEZ[1]

[1]*Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

We can trace the beginnings of natural history studies to the ancient philosophers, including Thales (c620-625 to c547-546 BCE), Anaximander (c610 to c546 BCE), Hippocrates (c460 to c377 BCE), and Aristotle (384 to 322 BCE). In Gibraltar, we can begin with Strabo and Mela, from about 60 BCE to 5 BCE, through to Portillo, Ayala, and others, to the present. Other speakers during this conference will talk about natural history research in the present, and future. I will draw on published and unpublished material to tell you a little about the rich history of natural history in Gibraltar through the life and works of John White, Willoughby Verner, and Anthony Wolley-Dod. Learning about, and understanding, the contributions of naturalists from the past provides inspiration to all of us to contribute to the study of natural history in Gibraltar.

Bio

Alex is a biologist. His undergraduate research was on the ecology of subtidal marine molluscs in Gibraltar. He then went on to do his PhD on the ecology of land molluscs in southern Iberia, focusing on biogeography and habitat structure effects on diversity. Alex is an Associate Researcher of the Institute of Life and Earth Sciences at the University of Gibraltar, an Honorary Fellow of the Gibraltar National Museum, and a Fellow of the Linnean Society of London. He is currently researching the history of natural history in Gibraltar, including geology and palaeoanthropology. Alex has recently published several papers on these topics, and a book that explores the history of the Gibraltar Skull.

GERALDINE FINLAYSON

The Gorham's Cave Complex:
An ecological overview of a World Heritage Site.

GERALDINE FINLAYSON[1,2,3], STEWART FINLAYSON[1,3], FRANCISCO GILES GUZMÁN[1,2], TYSON LEE HOLMES[1,3] & CLIVE FINLAYSON[1,2,3,4]

[1]Gibraltar National Museum, Gibraltar
[2]Liverpool John Moores University, United Kingdom
[3]Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar
[4]University of Toronto, Canada

Abstract

The Gorham's Cave Complex, Gibraltar's World Heritage Site, was inscribed on to UNESCO's World Heritage List in July 2016. It covers an area of 28 hectares from the sea level caves on the east side of the Rock to the top of the Mediterranean Steps 426 metres above sea level.

The site is inscribed under UNESCO's cultural Criterion (iii):

> *"Gorham's Cave Complex provides an exceptional testimony to the occupation, cultural traditions and material culture of Neanderthal and early modern human populations through a period spanning approximately 120,000 years. This is expressed by the rich archaeological evidence in the caves, the rare rock engravings at Gorham's Caves (dated to more than 39,000 years ago), rare evidence of Neanderthal exploitation of birds and marine animals for food, and the ability of the deposits to depict the climatic and environmental conditions of the peninsula over this vast span of time. The archaeological and scientific potential of the caves continues to be explored through archaeological research and scientific debates, providing continuing opportunities for understanding Neanderthal life, including their capacity for abstract thinking."*

The Statement continues: *"...The attributes that express* [Outstanding Universal Value] *are the striking cluster of caves containing intact archaeological deposits that provide evidence of Neanderthal and early modern human occupation of Gibraltar and the landscape setting which assists in presenting the natural resources and environmental context of Neanderthal life..."* (Statement of OUV, July 2016).

Although inscribed under the UNESCO cultural criteria, the World Heritage Site also contains unique topography and geological features, as well as natural cliff vegetation and rocky shoreline communities, which are known to have existed at the time of the Neanderthals.

The evidence of the relationship of the Neanderthals and their environment can be clearly seen in this site. Part of this landscape was subjected to irreversible change with sea level rise 10,000 years ago; ancient raised beaches, scree slopes, shorelines and dunes within the site are reminders of the dynamic and precarious nature of a coastal world that was in a constant state of flux. The incomparable topography of the Rock of Gibraltar, as well as its modern-day flora and fauna, with many species still present from ancient times, opens up an exclusive window into the lost world of the Neanderthals.

This paper will consider the environment of the Neanderthals and the exceptional and vivid picture that can be built from the evidence provided by this World Heritage Site.

Please see previous entry for this speaker for a bio.

STEWART FINLAYSON

The Pleistocene avifauna of Gibraltar

STEWART FINLAYSON[1,2]

[1]Gibraltar National Museum, Gibraltar
[2]Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar

Abstract

The Pleistocene deposits from Gibraltar's caves are renowned for their richness in subfossil material. In recent years the bird material recovered has put Gibraltar at the top of the world list of Pleistocene avifauna. The main caves in question are Gorham's and Vanguard Caves, supplemented by the Devil's Tower Rock Shelter and Ibex Cave. In all, 161 bird species, roughly equating to a third of the European avifauna, have been identified from these caves.

My aim is to provide a synthesis of this rich avifauna, comparing it with the present-day avifauna of the Rock of Gibraltar and of the region of the Strait of Gibraltar. I will take a habitat approach, describing the range of habitats that were available to birds in the late Pleistocene and the bird species that occupied these habitats. I will also consider the climatological implications of the presence of particular bird species at specific times in the Late Pleistocene.

Bio

Stewart Finlayson is the Director of the Gibraltar National Museum's Natural History Department and has just completed his PhD at Anglia Ruskin University, Cambridge (UK). Stewart's PhD is in Life Sciences, Evolutionary Biology, specifically looking at the relationship between Neanderthals and birds, how Neanderthals exploited these animals, what species, in specific, were being used, and for what reason. Stewart is also working on birds as climate indicators, trying to establish what habitats looked like based on the bird species found in the fossil record across Europe.

Stewart's passion has always been wildlife, and he has been involved from a very young age, in various studies working with birds around Iberia alongside Prof Clive and Prof Geraldine Finlayson; his parents.

Stewart heads a study of Chiroptera in Gibraltar since 2013. The study, aptly named Gib-Bats, has looked at the population status of bats within Gibraltar and identified which species have gone locally extinct, and also identified new species, which had not been described for Gibraltar before.

Stewart holds a grade 7 bat license in Gibraltar and an expert bat ringing licence in Spain. In 2017, He was unanimously voted into the council of the Spanish Association for Bat Research and Conservation (SECEMU). In 2019, Stewart was also made a member of the IUCN Bat Specialist Group. He is the representative for Gibraltar and works with his counterparts in Spain and Portugal advising on species status in the Iberian Peninsula amongst other things.

Stewart is also a successful Wildlife Photographer, member of the Royal Photographic Society and has published his works in various books and magazines. Stewart is co-author of 'A Guide to Wild Spain, Portugal and Gibraltar' published by Santana books and lead author of 'Lost World' Secrets of a World Heritage Site' published by the Gibraltar National Museum. He is currently in the process of writing his third book, this time with Pelagic Publishing.

CLIVE FINLAYSON

Bird migration in the Strait of Gibraltar - flyways, bottlenecks and stop overs:

I. Terrestrial and aquatic species.

II. Coastal and pelagic species.

CLIVE FINLAYSON[1,2,3,4]

[1]*Gibraltar National Museum, Gibraltar*
[2]*University of Toronto, Canada*
[3]*Liverpool John Moores University, United Kingdom*
[4]*Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

This abstract covers two presentations that are intended to complement each other in an effort to bring up to date our knowledge of bird migration in the region of the Strait of Gibraltar. The presentations will aim to situate what we observe in Gibraltar and the Strait in a wider geographical context, reflecting the nature of migratory birds. Contextualizing what we observe at local level within the framework of the annual cycle of migratory birds is critical to our understanding of their biology and in assisting efforts to conserve these species.

The concept of migratory flyways has been developed precisely in order to rally governments from nations on the migration paths of species into joint action. It recognizes the need to take a holistic, international, approach to migratory bird conservation. We must not take the flyway concept too literally, however, as each species, and often different populations within species, will behave in their own way in response to their biological needs.

Bottlenecks, and the Strait of Gibraltar is one of the most important globally, are areas where birds gather ahead of the crossing of a major barrier, such as the sea. The bottlenecks are the result of the accumulation of birds from wide geographical areas in confined geographical locations over very specific time frames. Such mass gatherings bring conservation problems of their own.

Bio

Prof Clive Finlayson is the Director, Chief Scientist and Curator of the Gibraltar National Museum. He is also the Director of the University of Gibraltar's Institute of Life and Earth Sciences. Clive has a first class Honours Degree in Zoology from the University of Liverpool and was awarded a doctorate (DPhil) from the University of Oxford in 1980. In 1991 he completed his MSc in Museum Studies at the University of Leicester. He was appointed a Beacon Professor of the University of Gibraltar in 2019.

Clive is an evolutionary ecologist and his main areas of research are the biogeography of hominins, avian biogeography and evolutionary ecology. In 2001 Clive was made Adjunct Professor in the Department of Anthropology at the University of Toronto and in 2003 he was awarded MBE in HM the Queen's New Year Honours. He was elected a Member at the Academia Europaea in 2010. In 2018 Clive was appointed Visiting Professor at Liverpool John Moores University's Faculty of Science. Clive has worked as a consultant for the UNESCO World Heritage Centre, Paris.

Clive has published widely in peer-reviewed journals and has written a number of books, including Neanderthals and Modern Humans (Cambridge University Press), The Humans who went Extinct, the Improbable Primate, The Smart Neanderthal (Oxford University Press) and Birds of the Strait of Gibraltar and Avian Survivors (Bloomsbury).

TYSON LEE HOLMES

Bat Research and Conservation in Gibraltar: *Its history, current projects and a look to the future.*

TYSON LEE HOLMES[1,2,3,4,5] & STEWART FINLAYSON[1,2,3,4,5]

[1]*The Gib-Bats Project, Gibraltar*
[2]*Gibraltar National Museum, Gibraltar*
[3]*Institute of Life and Earth Sciences, University of Gibraltar, Gibraltar*
[4]*Gibraltar Ornithological & Natural History Society, Gibraltar*
[5]*SECEMU – The Spanish Association of Bat Research and Conservation, Spain*

Abstract

Riddled with over 200 recorded natural caves and 55km of tunnels, the Rock of Gibraltar presents the perfect roosting habitat for bats. Or at least it once did…

The first bat census records for Gibraltar dating from the 1960s-70s account for over 36,000 bats, mostly dominated by two cave-dwelling species: the Schreibers' bat (*Miniopterus schreibersii*) and the Greater Mouse-Eared bat (*Myotis myotis*). These censuses were not scientific in nature and carried out by non-specialists but nevertheless mark the origins of bat conservation in Gibraltar. Following the founding of the Gibraltar Ornithological and Natural History Society in 1976, its Mammal Section eventually took over responsibility for safeguarding the future of bats on the Rock. However, their records already showed a sharp decline in numbers from those previously recorded which is corroborated by correspondence from visiting bat specialists from the United Kingdom in the 1980s-90s. Links with the Bat Conservation Trust (UK) where later established.

The Gib-Bats Project was created in 2013 as a collaborative study which sought to identify all bat species found on the Rock as well as their roosts and feeding grounds in order to better understand their ecology, with the ultimate aim of developing a national conservation strategy for bats. We report that our Initial findings have shown that up to seven different species currently occur in Gibraltar, some previously unrecorded on the Rock. However, other species have become locally extinct and populations have crashed with an alarming 97% decline since records began. We outline the reasons for this decline, which range in complexity and require further research if the remaining populations are to survive into the future. In the second half of our presentation, we discuss our current research projects in the region and conclude with questions on the future prospects of bat conservation in Gibraltar.

Bio

Tyson is a part-time PhD student at the Institute of Life and Earth Sciences of the University of Gibraltar, researching the behavioural ecology of avian aerial insectivores in Gibraltar. His interest in aerial insectivores stems from his wider research into bats, having co-founded the Gib-Bats Project in 2013, which also includes an education and outreach programme. On the back of this Tyson is now involved in a long-term collaborative project, this time over a wider geographical area, looking at the temporal and spatial dynamics of cave-dwelling bats across southern Iberia and North Africa. In his role as Senior Researcher within the Natural History Department of the Gibraltar National Museum, and together with colleagues at the Gibraltar Botanic Gardens and the Gibraltar Ornithological & Natural History Society, Tyson is also researching the behavioural ecology of bats, swifts and crag martins in Gibraltar, by trapping these migratory species while they are either breeding, wintering or transiting through Gibraltar and tracking their movements using the latest available technology. Tyson is a member of the Bat Conservation Trust, the Spanish Association for Bat Research and Conservation (SECEMU) and the Gibraltar Ornithological and Natural History Society. Tyson holds a Grade 7 bat licence in Gibraltar and an Expert Ringer bat licence in Spain.

DARREN FA

Humans and their relationship with the sea: *With special reference to Gibraltar.*

DARREN FA[1]

[1]*Institute of Life and Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

Living on a Rock that is almost entirely surrounded by water, it comes as little surprise that the human inhabitants of Gibraltar have taken advantage of the harvest provided by the sea for millennia. The history of our association with the sea is well-documented, with evidence from cultural, literary and archaeological sources pointing towards a sustained and at times, directly exploitative relationship with the marine realm.

Over the last thirty years, a good deal of work has been carried out that points to the degree and depth of this relationship, and moreover has made a significant contribution to how far back in time such a connection might have existed.

In this presentation, I will review the historical evidence that exists for exploitation of marine resources around Gibraltar, and then take some time to consider the evidence from prehistory, to see what light that might shed on how our early ancestors interacted with the marine environment along ancient shorelines.

Bio

Dr Darren Fa is currently the Director of Academic Programmes and Research at the University of Gibraltar. After obtaining his PhD in Biological Oceanography from the University of Southampton In 1998, he then moved to the Gibraltar National Museum in 1999 as Education and Research Officer, where he also read for a Masters Degree in Museums Studies from the University of Leicester (2004).

He was principal investigator on a number of EU and EFCHED funded projects, and received several international awards as part of the Museum team. He has published over 70 peer-reviewed articles in various international journals and book chapters both on ecological and archaeological subjects. As a qualified Scientific Diver he regularly carries out marine-related commissioned studies such as archaeological surveys and Environmental Impact Assessments. He is a director of the Gibraltar National Museum's Gibraltar Caves Project as well as member of the World Heritage Advisory Forum for the Gorham's Cave Complex.

He has also acted as a consultant for the HM Government of Gibraltar (HMGoG) and for UNESCO on both heritage and natural history matters, and has written several popular books and is regularly consulted for international media articles and television documentaries, on subjects ranging from Neanderthals through marine life to the fortifications of the Rock. Darren is a member of HMGoG's Nature Conservancy Council, as well as a Registered European Commission Expert on Environment and Higher Education, and Elected Fellow of the Linnaean Society of London. He is married with three daughters and somehow finds time to dive and play music when he can.

STEPHEN WARR

Gibraltar Marine Reserve:
Recent advances in surveillance monitoring.

STEPHEN WARR[1,2], DARREN FA[2], JOHN CORTES[1,2], LIESL MESILIO[1,2], CLIVE CRISP[1,2], KARL NETTO[1] & ROCIO ESPADA[3]

[1]Department of the Environment, Sustainability, Climate Change & Heritage, HM Government of Gibraltar, Gibraltar
[2]Institute of Life and Earth Sciences, University of Gibraltar, Gibraltar
[3]Marine Mammal Information, Research & Conservation

Abstract

An increasing number of EU Directives and International Conventions now require regular monitoring of different marine ecosystems to help determine the environmental status of coastal and offshore waters in the Western Mediterranean. Descriptors being assessed as part of Gibraltar's marine surveillance monitoring programme include intertidal, benthic and pelagic habitats as well as indicator marine species ranging from threatened macro-fauna e.g. limpets to mega-fauna e.g. cetaceans and marine reptiles.

Assessing the pressures and threats affecting marine ecosystems within the Gibraltar Marine Reserve is also an important element of the work carried out. The creation of a dedicated Environmental Protection and Research Unit in 2014 has significantly improved data collection, monitoring and enforcement of applicable marine protection legislation. Recent advances have also been made using a range of tools including Unmanned Aerial Vehicles (UAVs) and underwater surveillance equipment. An overview of some of the results collected so far will be presented along with a synopsis of future monitoring work streams that will be implemented within the Gibraltar Marine Reserve.

Bio

Stephen is currently the Senior Environmental Officer in the Department of the Environment, Heritage and Climate Change and is actively involved in the management of Gibraltar's marine and terrestrial environment. He completed his first degree in Environmental Science at the University of Southampton and then obtained a Master's Degree in Environmental Management from the Imperial College, London. He is currently reading for a PhD in Marine Science at the University of Gibraltar's Institute of Life and Earth Sciences. His research interests have centred on Marine Protected Areas (MPAs), coastal ecosystems and marine pollution and he has been managing Gibraltar's Marine Surveillance Programme for over 10 years as part of a wider marine research and policy development portfolio. This includes overseeing the implementation of the EU's Marine Strategy, Water Framework, Habitats and Marine Spatial Planning Directives.

Stephen's experience in marine management has helped him take on the role of lead coordinator for the implementation of Gibraltar's Marine Protection Regulations. He has represented the Department of the Environment in high-level forums such as the European Commission's Mediterranean Biogeographical Expert Working Group (Marine), the Integrated Maritime Policy Working Group and the Brexit Technical Committee on Environment issues. Stephen has also formed part of the Cross-border Fishing Commission and continues to be active in this field being a member of the local Fishing Working Group established by the Ministry of the Environment.

Stephen's part-time research now focuses on marine connectivity and its role in the design of MPAs in the Straits of Gibraltar region using the endangered limpet *Patella ferruginea* as a model species.

LEWIS STAGNETTO

Understanding annual changes in phytoplankton community structure: *What are the factors driving these changes in the Strait of Gibraltar?*

LEWIS STAGNETTO[1,2]

[1]*The Nautilus Project, Gibraltar*
[2]*Institute of Life & Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

Environmental conditions are key in driving biological changes within any given community. Phytoplankton communities are no different. Therefore, understanding the physical parameters which are driving oceanic chemistry within the Strait of Gibraltar is fundamental in understanding the changes being observed in the biological communities. Although much work has been done to try and unravel the drivers of physical and chemical changes, further work is required to better understand exactly how these changes manifest themselves in an unpredictable stretch of water like the Strait of Gibraltar. This review analyses much of the work that has been accumulating over the last quinquagenary and attempts to collate and discern potential implications of these findings within the Strait of Gibraltar.

Bio

Lewis Stagnetto is the Marine Biologist and co-founder of the Nautilus Project (TNP), a non-governmental organisation, focusing on local marine issues. Presently, TNP are running a series of campaigns focused on the local reduction of disposable plastic by raising awareness to the harmful effects it has on the environment. TNP are engaging with all levels of the community in order to promote this important message and are pleased to have achieved a ban on the commercial importation of products with microbeads into Gibraltar.

Lewis is a PhD student within the Institute of Life and Earth Sciences, at the University of Gibraltar. He has a particular interest in how climate change is affecting the oceans and the organisms within it. He is presently researching changes in phytoplankton communities within the Straits of Gibraltar and is attempting to understand the factors driving those changes. Phytoplankton are considered to be a key aspect of carbon exportation from the surface waters to marine sediments and could have huge impacts on future oceanic carbon chemistry.

His research has taken him from the Southampton University in the UK, where he studied for his degree, to University of Wilmington, North Carolina, where he undertook a research project closely related to his present work. He also has a degree in Computer science from Nottingham Trent University and is a Fellow of the Linnean Society of London.

LIESL MESILIO

The Changing Tides of Conservation Policy

LIESL MESILIO[1,2]

[1]Department of the Environment, Sustainability, Climate Change & Heritage, HM Government of Gibraltar, Gibraltar
[2]Institute of Life and Earth Sciences, University of Gibraltar, Gibraltar

Abstract

Conservation policy has traditionally been fragmented, missing a wholistic overview at an international level. Disjointed pieces of legislation have failed to consider the critical links in global ecosystem networks. This has been addressed in part by some International Conventions but the shortfalls of international environmental law are all too evident.

Conservation policy in geographical isolation, has on many occasions, failed to avoid the negative impacts on species and habitats at an international level. Transferring environmental damage from developed nations to emerging economies must be avoided.

Conservation policy in Gibraltar is discussed in this context, assessing its application and contribution to conservation management and biodiversity net gain at local, regional and international levels.

Bio

Liesl Mesilio is a Geography Graduate of the University of Reading and a Doctor of Philosophy from Imperial College, University of London. At Imperial College, she read her Masters degree in Environmental Technology which was then followed by a PhD in Environmental Geochemistry. She conducted the first inorganic geochemical baseline survey of soils in Gibraltar; a thesis which, subsequently formed the basis for contaminated land policy and management in Gibraltar. While at Imperial College she lectured on the Master's degree in Environmental Technology, particularly in relation to environmental risk assessments and strategic environmental management.

She is a Chartered Scientist and Chartered Environmentalist who has twenty years of work experience in a wide array of fields within the portfolio of environmental management. Six of the aforementioned twenty years were spent as an Environmental Consultant, working on contaminated land, environmental risk monitoring and sustainable development projects in Europe and Internationally. During the past fifteen years, she has worked for Her Majesty's Government of Gibraltar, at the Department of the Environment, Sustainability, Climate Change and Heritage, being the first full time Environmental Scientist employed by the Government in this field. She is now the CEO and Chief Scientist of the Department whose mandate is to achieve a high quality environment by providing effective environmental protection, addressing the threat of climate change, protecting and enhancing the natural environment. Her portfolio also includes developing sustainable waste management practices; promoting energy efficiency and sustainable energy generation as well as ensuring that Gibraltar's development respects the delicate balance between environment, economy and society. She has been instrumental in the delivery of environmental governance and drafted primary and secondary legislation in this field.

JOHN CORTES

Gibraltar – A Conservation Overview

JOHN CORTES[1,2]

[1]*HM Government of Gibraltar, Gibraltar*
[2]*Institute of Life and Earth Sciences, University of Gibraltar, Gibraltar*

Abstract

For its size, Gibraltar has a diverse fauna and flora, which survives to this day despite pressures of human use and activity.

This is the result of intense the advocacy of non-governmental organisations, together with comprehensive legislation and planning policies.

The success of biodiversity conservation in Gibraltar in recent years has however faced its challenges, not least in the marine environment. Here, international politics potentially come into play in masking environmental considerations.

The stepwise development of nature conservation measures is described, including the growth in size of protected areas, using specific examples, and linked to a parallel increase in research and knowledge with the expansion in the work of institutions such as the National Museum and Botanic Gardens.

Protection of existing habitats and biodiversity has evolved into habitat restoration and re-introduction of species lost in the recent past. There have been steps taken in re-wilding, coinciding with the growth of such initiatives in Europe and elsewhere. These are discussed.

There is discussion too of prospects for the future, both in conserving the existing biodiversity and in its enhancement.

Bio

The Hon. Prof John Cortes MP is Minister for Education, the Environment, Sustainability, Climate Change, Heritage and Culture in HM Government of Gibraltar. As Minister for the Environment, he has introduced nearly 200 items of environmental legislation which have included the extension of protected areas. He is a Beacon Professor of the University of Gibraltar and holds an honorary DSc of the University of Kingston. Formerly he was the Director of the Gibraltar Botanic Gardens (1991-2011) and General Secretary, Gibraltar Ornithological & Natural History Society (1976-2011). His other appointments have included Justice of the Peace and President, Gibraltar Magistrates' Association (2008-2011).

John has a BSc (Hons) in Botany and Zoology from Royal Holloway College, University of London, 1979, and a D.Phil from Magdalen College and the Animal Ecology Research Group, Oxford, 1983. In 2003, he was awarded an MBE for services to ecology and conservation.

Dr Cortes' research and publications reflect his interests in ornithology, plant and animal ecology, primatology, and conservation biology. Special interests include invasive species, reptile ecology, cliff ecology, phenology of migration, and ecology and behaviour of Barbary macaques. John has field experience in Gibraltar, Spain and North Africa (especially Morocco).