TUESDAY 11 APRIL 2017

ZSL SCIENCE AND CONSERVATION EVENT

The Meeting Rooms, Zoological Society of London,
Regent's Park, London NW1 4RY

AGENDA

Conserving the mountain chicken frog: the impact of chytridiomycosis under scrutiny

Chair: Professor Andrew Cunningham, Institute of Zoology, ZSL

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Introducing the mountain chicken

Dr Mike Hudson, Durrell Wildlife Conservation Trust
Disease driven near extinction of the mountain chicken: the inside story

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Ex-situ populations of mountain chickens: management and importance for conservation

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ZSL SCIENCE AND CONSERVATION EVENTS

ABSTRACTS

Conserving the mountain chicken frog: the impact of chytridiomycosis under scrutiny

Tuesday 11 April 2017
The Meeting Rooms, The Zoological Society of London, Regent's Park, London NW1 4RY

Introducing the mountain chicken
Dr Helen Meredith, Executive Director, Amphibian Survival Alliance

The Critically Endangered mountain chicken (*Leptodactylus fallax*) is the one of the largest frogs in the Western Hemisphere, with females reaching over 20cm in length (snout to vent). Long celebrated by the inhabitants of its two home islands – Dominica and Montserrat in the Caribbean – this frog has a strong cultural presence, and was once widely consumed as a national dish of Dominica. The mountain chicken has a fascinating reproductive strategy, currently thought to be unique to this species, and demonstrates devoted parental care to its offspring. It is also a crucial part of its ecosystem, being a voracious predator of invertebrates and other prey. It has historically played a significant role in pest control, and helping to maintain healthy forest systems. Its future hangs in the balance due to a precipitous decline in populations over the last 15 years or more, caused by factors such as disease, volcanic eruptions, and potentially over-exploitation. It is vital that we continue to fight for the conservation of this remarkable species. As part of a much wider global amphibian extinction crisis, we must continue to develop collaborative, holistic solutions to provide space, resources, and threat mitigation for the amphibians that share our environments around the world.

Helen Meredith joined the Amphibian Survival Alliance (ASA) as Executive Director in 2016, following 10 years working on the coordination of global conservation actions for amphibians. She coordinated the EDGE Amphibians initiative at the Zoological Society of London (ZSL) from 2006-2011, developing conservation programmes for evolutionarily distinct and threatened species, and raising awareness of the plight of amphibians. She recently completed her PhD at the Institute of Zoology, ZSL, and the Durrell Institute of Conservation and Ecology, University of Kent, on "Improving the impact of amphibian conservation", which focused on developing the practice of evidence-based conservation decision-making. During this time, she was also a Programme Officer for the IUCN SSC Amphibian Specialist Group, contributing to the development of ASG's strategy and the Amphibian Conservation Action Plan (ACAP), which acts as a vital roadmap for the work ASA. Helen is committed to continuing to promote collaboration across the amphibian conservation community and beyond, and celebrating the amazing work of ASA's partners and the remarkable diversity of amphibians around the world.

Disease driven near extinction of the mountain chicken: the inside story
Dr Mike Hudson, Durrell Wildlife Conservation Trust

Amphibian chytridiomycosis has caused precipitous declines in hundreds of species worldwide. Due to the rapidity of most chytridiomycosis driven declines, data on the impact of the disease are not species wide (often being limited to individual populations) and often fail to identify the precise timing of disease emergence. By tracking mountain chicken populations across the species' geographic range, before, during and after the emergence of chytridiomycosis, we quantified real-time species-level impacts of this disease for the first time. Population trend data were collected using night time visual encounter surveys over 15 years on Montserrat and 10 years on Dominica. These data show a range-wide species decline amongst the fastest ever recorded, with a loss of over 85% of the population within 18 months on Dominica and near extinction on Montserrat. Genetic diversity of the wild Dominican population declined significantly due to chytridiomycosis, but emergency measures to establish a captive assurance population captured a representative sample of genetic diversity from Montserrat. If the Convention of Biological Diversity's targets, such as preventing the loss of known threatened species and preventing the loss of genetic diversity from a range of organisms, are to be met, it is important to evaluate the reasons why they appear consistently unattainable. For example, the emergence of chytridiomycosis in the mountain chicken was predictable, but the decline could not be prevented. As a result, there is an urgent need to build mitigation capacity in locations where amphibians are at risk from chytridiomycosis.

Mike Hudson has been involved in conservation science throughout his education, carrying out projects on an invasive mongoose and a critically endangered lemur during his undergraduate and Masters degrees respectively. After a conservation science internship at Durrell Wildlife Conservation Trust (Durrell), he began a PhD on the conservation management of the mountain chicken frog with the University of Kent, Institute of Zoology (IoZ), ZSL, and Durrell. His PhD covered much of the work you will hear about today. Mike has recently begun work at Durrell as a Conservation Scientist on the next phase of the Mountain Chicken Recovery Programme on Montserrat. He continues to be based at IoZ.

Ex-situ populations of mountain chickens: management and importance for conservation
Dr Christopher Michaels, Acting Lead Keeper, Herpetology Section, ZSL

Mountain chicken frogs from Dominica and Montserrat have been established in captivity in several different instances, including the biosecure population used for conservation breeding. The management of these populations involves close collaboration between a number of zoos, and the research and field components of mountain conservation. Captive mountain chickens form a key part of the conservation strategy for the species and have delivered important research, conservation and education outputs for the programme.

Chris Michaels is an amphibian and reptile biologist who works in the Herpetology Section at ZSL London Zoo. After completing an undergraduate degree at the University of Oxford he gained his doctorate in amphibian conservation from the University of Manchester. Alongside zookeeping duties, Chris' research interests include amphibian and reptile captive husbandry, physiology, behaviour, natural history and conservation strategy. He also works on conservation projects, including those for Mexican *Ambystoma* salamanders, British pool frogs and Indian amphibians. He has worked with mountain chickens since starting at ZSL in 2014 and has contributed captive breeding and research in the species since.

Emergency action: in-situ anti-fungal treatment during a chytridiomycosis epidemic
Dr Mike Hudson, Durrell Wildlife Conservation Trust

The emerging infectious disease chytridiomycosis, caused by the fungus *Batrachochytrium dendrobatidis* (Bd), threatens hundreds of amphibians globally. In the absence of field-based mitigation methods for this disease, the Amphibian Conservation Action Plan advocates captive assurance programmes to prevent extinctions. Unfortunately, with the co-operation of the entire global zoo community, the International Union for the Conservation of Nature's (IUCN) Amphibian Ark estimates only 50 species could be saved in this way. Clearly, if catastrophic losses are to be averted, alternative mitigation techniques need to be developed. There has been an absence of trialling laboratory-proven interventions for chytridiomycosis in field settings, which must change in order to allow informed management decisions for highly threatened amphibian populations. We tested the in-situ treatment of individual mountain chicken frogs using the antifungal drug, itraconazole. Multi-state mark recapture analysis showed increased probability of survival and loss of Bd infection for itraconazole treated frogs compared with untreated animals. There was evidence of a prophylactic effect of treatment as, during the treatment period, infection probability was lower for the treated animals than untreated animals. Whilst a long-term, post treatment increase in survival was not observed, a deterministic population model estimated antifungal treatment would extend time to extinction of the population from 49 to 124 weeks, an approximated 60% increase. In-situ treatment could, therefore, be a useful short-term measure to augment other conservation actions for amphibian species threatened by chytridiomycosis or to facilitate population survival during periods of high disease risk.

Conservation management of the mountain chicken on Dominica
Benjamin Tapley, Curator of Herpetology, ZSL

On Dominica, mountain chicken frogs are an important part of local culture. The mountain chicken was once the national dish and they feature on the Dominican coat of arms. The conservation of the mountain chicken is viewed by local government as vitally important for Dominica as this frog is part of the natural heritage. In the face of the chytrid epidemic, a captive breeding facility was constructed in the Botanical Gardens in Roseau, the capital of Dominica. Local capacity is a vital component of the project. Dominican forestry staff were trained in amphibian monitoring and disease surveillance techniques and perform regular surveys across the historical range of the species. A molecular laboratory was built and equipped and a local molecular biologist was appointed and trained to analyse samples for the presence or absence of chytrid. Dominican forestry staff received intensive training on the captive husbandry of mountain chickens at ZSL London Zoo and at the Durrell Wildlife Conservation Trust. Since 2007, Department of Agriculture and Forestry staff have been trained in live food cultivation and amphibian husbandry in-country. Field research on the emergence, epidemiology and impact of chytridiomycosis in mountain chickens on Dominica has been ongoing. This work is assessing the current size and disease status of the remnant mountain chicken population and those of sympatric amphibian species on the island. Public outreach and engagement is pivotal if we are to build and maintain a large constituency for mountain chicken conservation. Work to date includes a successful social media component and a series of ongoing public engagement events. In late 2011, several juvenile mountain chickens were found on Dominica, the first evidence that frogs are breeding in the wild; a fantastic boost for the project.

Benjamin Tapley is a conservation biologist at ZSL. Ben's primary interests include the conservation breeding and captive management of amphibians and he is Chair of the British and Irish Association of

Zoos and Aquariums, Reptile and Amphibian Working Group, and Co-chair of the Amphibian Captive Breeding Working Group. Ben studied conservation biology at the University of Surrey Roehampton and did his MSc in Conservation Biology at the Durrell Institute for Conservation and Ecology. Ben is currently involved in several amphibian conservation programmes and is working on Chinese giant salamanders in China, Mountain chicken frogs from the Caribbean and Megophryid frogs in Vietnam. Ben is a Facilitator, IUCN Amphibian Specialist Group, Captive Breeding Working Group; Chair of BIAZA Reptile & Amphibian Working Group; and Amphibian Regional Collection Plan Coordinator, EAZA.

Trial reintroductions of mountain chickens into a Bd infected Montserrat: what did we learn?
Sarah-Louise Adams, Durrell Wildlife Conservation Trust

The introduction of the pathogenic fungus, *Batrachochytrium dendrobatidis* (Bd) to Montserrat, had devastating impacts on the native mountain chicken frog with only two known individuals remaining on the island. Whilst successful breeding of frogs evacuated during the declines in a network of breeding bio-secure captive populations secured the short-term future of the species, cost-effective long-term conservation is reliant on the successful reintroduction of the species. We conducted a series of experimental reintroductions of mountain chickens back into a site from which they were extirpated. The large body size of the mountain chicken meant we were able to surgically implant tracking devices enabling regular monitoring of Bd infection status and mortality rates due to chytridiomycosis. We carried out the reintroductions in both the wet and dry seasons between 2010 and 2014. Despite reintroduced animals adapting well to the environment, chytridiomycosis driven mortality severely impacted each of the dry season reintroductions but not the final, wet season release when the environmental conditions were outside those optimal for Bd. In this reintroduction no chytridiomycosis-related mortality was observed and Bd infection levels were delayed and subdued compared with the dry season releases, although extra-release site dispersal was increased. Year round surveys of two important Bd reservoir species conducted in conjunction with the reintroductions identified significant seasonal trends in Bd infection prevalence correlated with decreasing temperature and rainfall. The results of this study suggest optimising the timing of reintroduction to coincide with periods of seasonally low chytridiomycosis risk might facilitate an increased likelihood of reintroduction success.

Sarah-Louise first travelled to Montserrat in 2009 to assist with the itraconazole trial project run by Durrell and ZSL. After six months of 'washing frogs' and witnessing one spectacular volcanic explosion, she was recruited to manage the Darwin funded project "Saving the Montserrat mountain chicken". Sarah-Louise spent a further three years releasing, radio-tracking, catching and swabbing mountain chickens to provide Dr Mike Hudson with data for his PhD. She now works for Durrell based in the UK office in Bath, developing projects and raising funds to further our mission to save species from extinction.

Chair: Professor Andrew Cunningham, Institute of Zoology, ZSL

Andrew Cunningham joined the Institute of Zoology (IoZ) in 1988 as Veterinary Pathologist for the Zoological Society of London; a job which involved carrying out diagnostic pathology on zoo and wild animal species. Since 2001, he has been Head of Wildlife Epidemiology at the IoZ, leading a team of researchers working on wildlife diseases, with particular reference to biodiversity conservation, on a wide range of animal taxa: from snails to whales. He is currently Deputy Director of the Institute of Zoology.

FORTHCOMING SCIENCE AND CONSERVATION EVENTS
www.zsl.org/science/whats-on

Wildlife of the West African Savannah: unfamiliar and under threat
Tuesday 9 May 2017, 6pm - 7.45pm
ZSL Science and Conservation Event


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The savannah of West Africa once hosted large populations of African elephant, West African giraffe, lion, cheetah and wild dog, but these are now restricted to isolated pockets. This meeting will celebrate the amazing diversity of savannah systems, the ecological history of West Africa, the threats it's currently facing and the work under way to conserve it.

FIND OUT MORE
www.zsl.org/science/whats-on/wildlife-of-the-west-african-savannah-unfamiliar-and-under-threat

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Engaging with Parliament and responding to inquiries:
BES/ZSL workshop for ecologists interested in the science/policy interface
Friday 26 May 2017, 10am - 5pm

A one-day event, aimed principally at established scientists (post-doctoral and above), to review and interactively discuss key knowledge and processes involved in engaging with Parliament. It will focus on responding to Select Committee inquiries relevant to ecology, conservation and environmental management.

REGISTER
www.zsl.org/science/whats-on/engaging-with-parliament-and-responding-to-inquiries-a-beszsl-workshop

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Stamford Raffles Lecture 2017: How animals shape habitats, ecosystems and the global biosphere
by Professor Yadvinder Malhi, University of Oxford
Tuesday 20 June 2017, 6.30pm – 9.30pm

Yadvinder Malhi will explore a variety of ways in which animals can influence ecosystem structure, biomass, fire regimes and even climate, drawing on evidence from the Pleistocene to modern times, looking at scales from termites to mammoths, and drawing on ongoing experiments and "rewilding" projects.

BOOK TICKETS
www.zsl.org/science/whats-on/how-animals-shape-habitats-ecosystems-and-the-global-biosphere