Paulo C Alves & Klaus Hackländer

**Room D502**

This one-day session will be divided in two parts: talks and open discussion forum.

**Talks - New insights into lagomorph biology**

10.00 Reticulate evolution in Lagomorphs: conservation and management implications

*Paulo C Alves & J. Melo Ferreira*

10.20 Prehistoric translocation or natural colonization? - the origin of mountain hares on Gotland

*Hans Ahlgren et al*

11.00 Macroecology of the Order Lagomorpha; implications for the impact of global climate change

*Neil Reid et al*

11.20 Analyses of hare and fox game bags in Sweden indicate population crash in southern mountain hares

*Carl-Gustaf Thulin et al*

11.40 *Coffee Break - Fika*

12.00 Impact of EU Common Agricultural Policy on hares

*Klaus Hackländer*

12.20 Lightening talks (7+3 min)

 *Participants that are presenting posters on lagomoprhs*

13.00 Lunch

**14.00 Open discussion - The role of lagomorph as keystone species in a changing world**

Bringing together examples of challenges for lagomorphs due to changing environmental conditions. Lessons learned from various experiences in different regions will be discussed to work on management recommendations and ideas for future avenues of lagomorph research.

This workshop aims to initiate a review paper on this topic.

16.00 Conclusions and closing

**Abstracts**

**Reticulate evolution in Lagomorphs: conservation and management implications**

Paulo C. Alves1,2 & J. Melo-Ferreira1

*1 – CIBIO/InBIO - Laboratório Associado, Universidade do Porto, Campus Agrário de Vairão, 4485-661 Vairão; Departamento Biologia, Faculdade de Ciências da Universidade do Porto, 4099-002 Porto, Portugal.*

*2 - Wildlife Biology Program, University of Montana, 32 Campus Drive, Missoula, Montana 59812, USA.*

Lagomorphs are providing a remarkable window for evolutionary biology studies. Species of this mammal order are found across an enormous geographic range, occupying rather different ecological niches, spanning from arctic to arid habitats. This fact has facilitated a great diversity of evolutionary processes, namely reticulate and divergent diversification and adaptive radiations across extremely divergent environments. A major consequence of these evolutionary processes is the interspecific hybridization, which in fact is quite common among lagomorphs species, namely among hares (*Lepus*). In this talk, we will revise the major forces driving the natural and anthropogenic hybridization on lagomorphs, summarize the techniques to detect hybridization and discuss some of the consequences of this phenomenon in management and conservation.

**Prehistoric translocation or natural colonization? - the origin of mountain hares on Gotland**

Hans Ahlgren, Karin Norén, Anders Angerbjörn, Kerstin Lidén

Archaeological Research Laboratory, Department of Archaeology and Classical Studies, Stockholm University, SE-106 91 Stockholm, Sweden

(hans.ahlgren@arklab.su.se)

The majority of the present non-volant mammals on the island of Gotland have been introduced by people in modern times. One exception is the mountain hare (*Lepus timidus*) that was present on the island more than 9,000 years ago. This study investigates the origin and temporal change in genetic structure of the Gotland hares and the question of how mountain hares reached the island is asked. Two fragments of mtDNA, 130 + 164 BP from skeletal remains from ancient mountain hares from Gotland, the Swedish mainland and Lithuania were analysed and compared to 90 modern lepus timidus haplotypes from different locations in Eurasia and to the morphotype don-hare (*Lepus tanaiticus*). The ancient hares on Gotland fall into two different haplogroups separated by time which indicate that the mountain hare went extinct at one occasion with following events of re-colonization. Because of the isolated location of Gotland, it is probable that the hares were brought there by human mediated transports

**Macroecology of the Order Lagomorpha; implications for the impact of global climate change**

Neil Reid, Katie Leach, Ruth Kelly, Alison Cameron, Ian Montgomery

*Institute for Global Food Security, Queens University Belfast*

Expertly-validated SDMs and phylogenetically-controlled regression suggest that responses to climate change are related to species traits in the Lagomorpha. Climate change may impact more than two-thirds of lagomorphs by 2080, with leporids (rabbits, hares and jackrabbits) likely to undertake poleward shifts with little change in range extent, whilst pikas are likely to show shifts to higher altitudes associated with range declines. Model predictions based on abiotic variables may be misleading. Interspecific interactions are widely reported in the Order with closely related, large-bodied, similarly-sized species in agricultural landscapes or at high elevations likely to have competitive interactions. Hierarchical spatial models suggest that for some species biotic (mutualistic and competitive) interactions are important and we propose developing network analyses to quantify the strength of such biotic interactions to assess ecological network stability under future conditions.

**Analyses of hare and fox game bags in Sweden indicate population crash in southern mountain hares**

Thulin C-G, Winiger A, Kindberg J

Centrum för vilt- och fiskforskning/Center for Fish and Wildlife Research (CFW) Sveriges lantbruksuniversitet (SLU)/Swedish University of Agricultural Sciences, Sweden.

Scientific and undocumented observations indicate a decreasing population trend among mountain hares (*Lepus timidus*) across Fennoscandia (Finland, Sweden,

Norway). Explanations for this development include competitive exclusion by the brown hare (*Lepus europaeus*) driven by interference, interspecific hybridisation and/or differential disease susceptibility, but also climate change and predation have been suggested. We have used uncorrected game bag data densities at the county level to evaluate the importance of competition with brown hares and predation by red foxes (*Vulpes vulpes*) on the decline of mountain hares. During 1996-2010 mountain hares were declining in all but one of testable counties of Fennoscandia. The most negative population trend among mountain hares occurred in southern Sweden. Brown hares were also diminishing in southern Sweden, but at a rate comparable to that of mountain hares in northern Sweden. Negative correlation coefficients between red foxes and mountain hares exceed those with red fox and brown hares. The results support the importance of red foxes and brown hares for mountain hare population dynamics. The negative trends for the mountain hare in southern Sweden appear to have been initiated by ecological processes during the period 1984-1992, when a sarcoptic mange zooepidemic diminished the red fox population in Sweden.

**Impact of EU Common Agricultural Policy on hares**

Klaus Hackländer

Universität für Bodenkultur Wien (BOKU) Institut für Wildbiologie und Jagdwirtschaft. Vienna, Austria.

Hares followed man after agricultural land use lead to open landscapes suitable for this lagomorph species. In line with land use changes habitat suitability for small game varied over the last centuries. Currently, the fate of European hares is predominantly affected by the Common Agricultural Policy (CAP) of the European Union and the global market of agricultural products.

We studied the effects of land use, field size, crop types on hares dwelling in arable land for 15 years. With the help of telemetry, hunting bag analysis, food selection indices and reproductive parameters I will show the challenges for hares in our current agriculture and I will present future directions to reconcile sustainable land use and the conservation of small game species.