

ÁGRIP ERINDA OG VEGGSPJALDA

VISTÍS 2017/ ECOICE 2017

28.-30. APRÍL 2017
HÓLUM Í HJALTADAL



VISTFRÆÐIFÉLAG ÍSLANDS

STJÓRN VISTFRÆÐIFÉLAGS ÍSLANDS

Ingibjörg Svala Jónsdóttir, formaður
Gísli Már Gíslason, gjaldkeri
Erpur Snær Hansen, ritari
Tómas Grétar Gunnarsson, ábm. félagaskrár
Ágústa Helgadóttir, vefsíðustjóri
Jóhann Þórsson, varamaður
Borgný Katrínardóttir, varamaður

UNDIRBÚNINGSNEFND

Ágústa Helgadóttir, Stjórn Vistís (Háskóli Íslands/Landgræðsla ríkisins)
Erpur Snær Hansen, Stjórn Vistís (Náttúrustofa Suðurlands)
Jóhann Þórsson, Stjórn Vistís (Landgræðsla ríkisins)
Agnes-Katharina Kreiling, Háskólinn á Hólum
Camille Leblanc, Háskólinn á Hólum
Kári H. Árnason, Háskólinn á Hólum

FAGNEFND VISTÍS 2017

Agnes-Katharina Kreiling, Tengiliðill Háskólans á Hólum
Ágústa Helgadóttir, Stjórn Vistís (Háskóli Íslands/Landgræðsla ríkisins)
Berglind Orradóttir, Landbúnaðarháskóli Íslands
Brynhildur Bjarnadóttir, Háskólinn á Akureyri
Camille Leblanc, Háskólinn á Hólum
Eric Dos Santos, Selasetrið, Hvammstangi
Erpur Snær Hansen, Stjórn Vistís (Náttúrustofa Suðurlands)
Jóhann Garðar Þorbjörnsson, Selasetrið, Hvammstangi
Jóhann Þórsson, Stjórn Vistís (Landgræðsla ríkisins)
Jónína Sigríður Þorláksdóttir, Rannsóknastöðin Rif, Raufarhöfn
Oddur Vilhelmsson, Háskólinn á Akureyri
Sigurður H. Árnason, Háskólasetur Vestfjarða, Ísafjörður /Háskólinn á Hólum
Starri Heiðmarsson, Náttúrufræðistofnun Íslands, Akureyri
Steinunn Hilma Ólafsdóttir, Hafrannsóknastofnun Rannsókna og ráðgjafastofnun hafs og vatna
Valtýr Sigurðsson, Biopol, Skagaströnd
Porkell Lindberg Þórarinnsson, Náttúrustofa Norðausturlands, Húsavík

Mynd á forsíðu: Guðrún Lára Pálmadóttir
Umbrot: Snorri Páll Davíðsson (*spd@gresjan.is*)

FÖSTUDAGUR / FRIDAY

12.00 REGISTRATION AND LUNCH

13.00 CONFERENCE OPENING

13.10 INTRODUCTORY LECTURE

13:10 Y1 **Ecological studies at Hólar University College**
Bjarni K. Kristjánsson

13.40 SESSION I - ARCTIC CHARR - Chair: Camille Leblanc

13:40 E1 **The Charr in Thingvallavatn - Gene expression, genetics and epigenetics**
Zophonías O. Jónsson

13.55 E2 **Ecological factors underlying parasitism in Icelandic freshwater fishes**
Anssi Karvonen

14.10 E3 **Evolution of reproductive barriers in sympatric Arctic charr morphs**
Kalina Kapralova

14.25 E4 **Maternal effects and the evolution of resource polymorphism in Icelandic Arctic charr**
Samantha V. Beck

14.40 POSTERS AND COFFEE

15.10 SESSION IIA - BIRDS - Chair: Erpur Snær Hansen

15:10 E5 **Formation of wintering distribution in a migratory bird through range-wide juvenile settlement**
Tómas Grétar Gunnarsson

15.25 E6 **Do residents outperform migrants? Implications of migratory strategy for individual fitness**
Verónica Méndez

15.40 E7 **Importance of agricultural and semi-natural habitats for breeding waders in low-intensity farming landscapes**
Lilja Jóhannesdóttir

15.55 E8 **Hot and warm: consequences of rising temperatures for breeding and beyond.**
Jose A. Alves

16.10 LEG STRETCHER

16.20 SESSION IIB - BIRDS - Chair: Erpur Snær Hansen

16:20 E9 **Temporal flexibility on breeding and migration of Icelandic Whimbrels and potential consequences for reproduction**
Camilo Carneiro

16.35 E10 **Dublin distrust and Reykjavik risks: Annual cycle of stress in arctic breeding long distance migrant**
Freydís Vigfúsdóttir

16.50 E11 **Gyrfalcon demographics revealed by non-invasive genetic sampling**
Kristinn P Magnússon

17.05 POSTER SESSION

18.30 SOCIAL EVENT (HÓLAR TOUR, LOPAPEYSU PARTÝ, BJÓRSETUR ÍSLANDS)

LAUGARDAGUR / SATURDAY

09.00 INVITED SPEAKER

The influence of Nitrogen fixation on biogeochemical processes and food web interactions in arctic streams: What are the implications for ecosystem change in a warming world?

09:00 Y2

Jill Welter

09.30 SESSION IIIA - FRESHWATER - Chair: Agnes-Katarina Kreilig

09:30 E12

The effect of whole stream warming on emergence time of aquatic insect species

Gísli Már Gíslason

09.45 E13

Modern Ostracod Distribution in Icelandic Lakes

Jovana Alkalaž

10.00 POSTERS AND COFFEE

10.30 SESSION IIIB - FRESHWATER - Chair: Agnes-Katarina Kreilig

10:30 E14

The sediment and the midges: the effect from chironomid larval activities on lake sediment

Jón S. Ólafsson

10.45 E15

Warming responses of two native Icelandic plants *Ranunculus acris* and *Thymus praecox ssp arcticus* in geothermal areas

Nia Sigrun Perron

11.00 E16

The concept of the Icelandic Master Plan for Nature Protection and Energy Utilization and an integrated process based ecosystem approach to evaluating areas

Skúli Skúlason

11.15 VISTÍS MEETING - RESOLUTION AND STRATEGIES

12.00 LUNCH

13.00 INTRODUCTORY LECTURE

Vistfræðirannsóknir á Hafrannsóknastofnun, rannsókn- og ráðgjafarstofnun hafs og vatna

13:00 Y3

Sigurður Guðjónsson

13.30 SESSION IV - MARINE AND SEASHORE - Chair: Starri Heiðmarsson

13:30 E17

The microbial ecology of the Öxarfjörður gas seepage pockmarks

Oddur Vilhelmsson

13.45 E18

Examining growth and trophic patterns of Northeast Atlantic cod across a millenium

Guðbjörg Ásta Ólafsdóttir

14.00 E19

Trophic Vulnerability of 0-Gruppe Atlantic Cod (*Gadus morhua*) and Saithe (*Pollachius virens*)

Anja Nickel

14.15 E20

Non-indigenous marine species in Icelandic waters

O. Sindri Gíslason

14.30 E21

Biodiversity of bivalves and gastropods around Iceland

Hrönn Egilsdóttir

14.45 POSTERS AND COFFEE

15.15 SESSION V - TERRESTRIAL - Chair: Jóhann Þórsson

15:15 E22

Herbivory by sheep and insects during primary succession

Bryndís Marteinsdóttir

15.30 E23

Reindeer summer grazing and small rodent winter disturbance: herbivores modify nutrient dynamics in tundra plants

Matteo Petit Bon

15.45 E24

Reindeer in East Iceland. Shifting summer ranges and changes in calving areas around Snæfell. The effects of Kárahnjúkar hydroelectric project.

Kristín Ágústsdóttir

16.00 E25

Restoration as a tool for ecological research

Ása L. Aradóttir

16.15 E26

Fræslægja (e. green hay) sem uppgræðsluáferð

Járngerður Grétarsdóttir

16.30 E27

CO₂ evolution in highland soils of different land cover types in Iceland

Utra Mankasingh

17.00 CONFERENCE EXCURSION TO VERIÐ

20.00 CONFERENCE DINNER

SUNDAY AT 11.00: POST-CONFERENCE EXCURSION TO HOFÓS: VISIT TO THE HOFÓS ICELANDIC IMMIGRATION MUSEUM AND THE FAMOUS SWIMMING POOL, LUNCH INCLUDED.

VEGGSPJÖLD / POSTERS

- V1 **Applying state-and-transition models to Iceland: an agenda for grazing research**
Isabel C Barrio, David S Hik, Jóhann Þórsson, Kristín Svavarsdóttir og Ingibjörg Svala Jónsdóttir
- V2 **Genetic analysis of Thessaly and Skyrian horse populations, two rare indigenous Greek horse breeds.**
Maria Mavrikidi, Athanasios Sasselos, Nikolaos Sdroulias, Athanasios Dalaklidis, Amanda Simpson, Nikolaos Kritikos, Theodore Sdroulias, Antonios Kominakis og Ariadne Loukia Hager-Theodorides
- V3 **Ástand lands og beit**
Ólafur Arnalds
- V4 **Connecting economy and ecology through landscape restoration**
Berglind Orradóttir, Hafðís Hanna Ægisdóttir, Ólafur Arnalds, Ása L. Aradóttir og Jóhann Þórsson
- V5 **Host-parasite interactions and population dynamics of rock ptarmigan in Iceland**
Ute Stenkewitz, Ólafur K. Nielsen, Karl Skírnisson og Gunnar Stefánsson
- V6 **Biological soil crust in the Icelandic highlands**
Rúna Björk Smáradóttir, Stefan Bartram og Ólafur S. Andrésson
- V7 **Bioprospecting Geothermally Heated Intertidal Pools: Interesting targets for biotechnology**
Sean Michael Scully
- V8 **The wintering population of Oystercatchers in Iceland**
Böðvar Þórisson, Verónica Méndez, José Alves, Kristinn H. Skarphéðinsson, Svenja Auhaug, Sölvi Rúnar Vignisson, Brynjúlfur Brynjólfsson, Cristian Gallo, Páll Leifsson, Jennifer A. Gill og Tómas Grétar Gunnarsson
- V9 **Diversity of Bryozoans on the southern coast of Reykjanes peninsula in SW-Iceland**
Ó. Sindri Gíslason, Hermann Dreki Guls og Halldór Pálmar Halldórsson
- V10 **Production of commodity chemicals from geothermal gases using hydrogen-consuming chemolithoautotrophs**
Cyril Lemaire, Guðný Inga Ófeigsdóttir, Snædís H. Björnsdóttir og Sigurður Brynjólfsson
- V11 **Effects of climate warming and herbivory on rate of decomposition in low and high Arctic**
Katrín Björnsdóttir, Isabel C Barrio og Ingibjörg Svala Jónsdóttir
- V12 **Vöktun gróðurauðlinda**
Jóhann Þórsson og Kristín Svavarsdóttir
- V13 **Endurheimt votlendis**
Sunna Áskelsdóttir og Ágústa Helgadóttir
- V14 **The International Arctic Science Committee – IASC**
Ingibjörg Svala Jónsdóttir og IASC Secretariat

Y1 Ecological studies at Hólar University College

Bjarni K. Kristjánsson

Hólar University College

bjakk@holar.is

Studies on ecological questions are well rooted in the operation of Hólar University College. These studies have been conducted by staff and students of the Department of Aquaculture and Fish Biology, mostly focusing on freshwater. The topics of the studies are variable, and cover the disciplines of evolutionary ecology, behaviour ecology, community ecology and ecophysiology. The department favours interdisciplinary approaches to answer interesting and timely questions in ecology. A large extent of the research is done in national and international collaboration. In the lecture I will give an overview of the studies conducted today and how they can be integrated under a common framework.

Y2 The influence of Nitrogen fixation on biogeochemical processes and food web interactions in arctic streams: What are the implications for ecosystem change in a warming world?

Jill Welter

St. Catherine University, Saint Paul, Minnesota, USA

jrwelter@stkate.edu

Despite widespread nitrogen (N) enrichment, many aquatic ecosystems experience N limitation, providing conditions where N₂-fixing organisms may thrive, especially as global temperatures continue to rise. Many cyanobacteria species have high thermal optima and warming should facilitate their proliferation, especially in N-limited arctic ecosystems; however, individual species responses and their potential interaction with the food web will determine the impact of N₂-fixation on ecosystem processes. Abiotic factors including temperature, light and nutrient availability, as well as grazing influence periphyton assemblage structure and can determine whether fixed N enters the stream food web or is exported downstream. Results from both geothermal streams in Hengill, Iceland and the Eel River, California reveal that N₂-fixation rates increase with warming and light availability; however, species shifts also occur, favoring different diatom taxa, including those with cyanobacterial endosymbionts (e.g., *Epithemia* spp.), under some conditions and free-living cyanobacteria (e.g., *Anabaena* spp.) as temperature increases. The effect of grazing is dependent on the initial periphyton assemblage. Grazing stimulates N₂-fixation by free-living cyanobacteria, while reducing N₂-fixation by highly palatable diatoms through consumption. The results suggest that arctic warming should facilitate growth of N₂-fixing organisms in streams and increase N availability; however, only the proliferation of highly edible diatoms may support stream food webs. The proliferation of inedible or toxic cyanobacteria may instead result in downstream export of N to near shore marine environments.

Y3 Vistfræðirannsóknir á Hafrannsóknastofnun, rannsókn- og ráðgjafarstofnun hafs og vatna

Sigurður Guðjónsson

Hafrannsóknastofnun, rannsókn- og ráðgjafarstofnun hafs og vatna
sigurdur.gudjonsson@hafogvatn.is

Vistfræðirannsóknir á Hafrannsóknastofnun eru margþættar bæði í sjó, ám og vötnum. Vistkerfi bæði í sjó og í ferskvatni eru að breytast hratt vegna hlýnunar. Þetta sést á breytttri útbreiðslu dýra og farleiðum. Þá hefur verið fylgst með fæðu helstu nytjastofna. Efnahagslögsaga Íslands er sjö sinnum stærra en Ísland. Hafin er kortlagning á sjávarbotninum og á því verkefni að ljúka á næstu 12 árum. Samhliða og í kjölfarið mun fara fram kortlagning helstu búsvæða á hafsbotninum. Stærsta rannsóknaverkefni Hafrannsóknastofnunar ár hvert er stofnmæling botnfiska. Í verkefninu er safnað mikið af vistfræðiupplýsingum. Frá þessum verkefnum og fleirum verður sagt.

E1 The Charr in Thingvallavatn - Gene expression, genetics and epigenetics

Zophonías O. Jónsson¹, Benjamín Sigurgeirsson¹, Kalina H. Kapralova¹, Jóhannes Guðbrandsson¹, Bjarni K. Kristjánsson², Sigríður Rut Franzdóttir¹, Arnar Pálsson¹ og Sigurður S. Snorrason¹

¹*University of Iceland*

²*Hólar University College*

zjons@hi.is

The four morphs Arctic charr in Lake Thingvallavatn are an invaluable system for studies of local phenotypic plasticity, adaptive variation and their interactions. Our focus has been the genetic divergence of the four morphs: the limnetic; planktivorous (PL) and piscivorous (PI), which have pointed snouts and evenly protruding jaws, and the benthic; large and small benthivorous (LB) and (SB), which have blunt snouts and shorter lower jaws. Furthermore we are interested in the interaction between genotype and environment in shaping these distinct phenotypes. We have reared offspring in common garden conditions and studied expression of mRNA and miRNA during development using both high-throughput sequencing and qPCR to identify a number genes and miRNAs that are differentially expressed between morphs. We have also identified SNPs with different morph specific ratios, confirming that the four morphs are genetically differentiated. Our current ddRAD-seq studies will add further detail. A broad overview of the main findings will be presented and an outline of our current endeavours. Our next aim is to analyse promoters of differentially expressed genes. We have sequenced whole genomes of both sexes of all four morphs and completed preliminary assembly of scaffolds. The next steps are sequence comparisons of promoter regions looking for polymorphisms and analysis of promoter methylation during development, which might reveal epigenetic regulation of phenotypic traits.

E2 Ecological factors underlying parasitism in Icelandic freshwater fishes

Anssi Karvonen

University of Jyväskylä, Department of Biological and Environmental Science, Finland
anssi.t.karvonen@jyu.fi

Factors explaining differences in parasitism between host individuals and populations are in the core of evolutionary ecology of host-parasite relationships. Here, I present data on parasite infections in three-spine sticklebacks (*Gasterosteus aculeatus*) and Arctic charr (*Salvelinus alpinus*) in Icelandic lakes. These data show that the level and diversity of infections are strongly driven by specific lake factors such as water temperature, but also by differences in the magnitude of parasite exposure among host individuals and populations. Such differences in infections can have important implications for selection on host immune function working against the infections, which again could influence processes of mate choice and even speciation.

E3 Evolution of reproductive barriers in sympatric Arctic charr morphs

Kalina Kapralova¹, Sigurður Sveinn Snorrason¹, Hrefna Sigurjónsdóttir¹, Bjarni Kristófer Kristjánsson², Zophonías Oddur Jónsson¹, Arnar Pálsson¹, Michael B. Morrissey⁴ og Jónína Herdís Ólafsdóttir³

¹*University of Iceland*

²*Holar University College*

³*Hafrannsóknastofnun*

⁴*University of St. Andrews*

khk2@hi.is

Ecological diversification of Arctic charr (*Salvelinus alpinus*) into four phenotypic variants within lake Thingvallavatn has occurred in just 10,000 years following the last glacial maximum. Ecological speciation may be progressing within this natural experimental system as evidenced by distinct variation in life history characteristics, behaviour and trophic morphology. The central question of my research is to investigate how phenotypic diversity is maintained in the face of gene flow from other populations or subspecies, specifically focusing on the tempo and mode of reproductive isolation among sympatric morphs. The focus is on the two smaller morphs planktivorous (PL) and small benthic (SB), which have diverged along the limnetic to benthic ecological axis and live in different parts of the lake. Curiously however they spawn in the same places and have overlapping spawning times. Our genetic data show that they are distinct and preliminary data imply that their hybrids are compromised. The central hypothesis underlying our investigation is that reproductive isolation between morphs is partly due to differences in the exact timing (e.g. time of the day), precise spawning location, spawning behavior and/ or strong negative selection against hybrid offspring. To address this we are employing a combination of observations in the wild, laboratory breeding experiments and breeding experimental manipulation with the power of next generation sequencing.

E4 Maternal effects and the evolution of resource polymorphism in Icelandic Arctic charr

Samantha V. Beck^{1,2}, Katja Räsänen³, Zophonías O. Jónsson², Bjarni K. Kristjánsson¹, Skúli Skúlason¹ og Camille A. Leblanc¹

¹*Department of Aquaculture and Fish Biology, Hólar University College*

²*Institute of Life and Environmental Sciences, University of Iceland*

³*Department of Aquatic Ecology, Eawag*

beck@holar.is

A major challenge in evolutionary ecology is being able to understand the determinants of phenotypic variation and its consequences for the performance of individuals and diversification of natural populations. One putative, but rarely investigated, facilitator of adaptive diversification is maternal effects. Studies on polymorphic Arctic charr (*Salvelinus alpinus*) have shown that maternal effects can influence an individual's phenotype and performance. Here we tested the hypothesis that size variation during early ontogeny in sympatric charr morphs may influence variation in the expression of genes related to growth and skeletal development. We studied seven wild Icelandic Arctic charr populations and measured egg size (post-fertilisation and eye stage), individual size (hatching and first feeding stage) and also relative gene expression at different developmental stages. Our early findings indicate that expression levels of genes related to growth and skeletal development are higher in smaller free at hatching stage. Earlier expression of these genes in smaller free embryos could be indicative of not only compensatory growth, but also of developmental plasticity in craniofacial structures. These results are the first to demonstrate a role for maternal effects in influencing individuals' developmental trajectories, which may influence the rapid evolution of resource polymorphism in fish.

E5 Formation of wintering distribution in a migratory bird through range-wide juvenile settlement

Tómas Grétar Gunnarsson¹, José Alves¹, James Gilroy³, William J. Sutherland³, Peter M. Potts⁴ og Jennifer A. Gill²

¹*Rannsóknasetur Háskóla Íslands á Suðurlandi*

²*University of East Anglia*

³*University of Cambridge*

⁴*Farlington Ringing Group*

tomas@hi.is

Many long-lived vertebrates show high levels of site-fidelity (philopatry) as adults. As occupied sites vary greatly in quality, adult philopatry has profound consequences for individual fitness and demography. Given the prevalence of adult philopatry in many populations, the initial settlement decisions of juveniles are pivotal in shaping distributions and demographic processes across population ranges. Of particular importance are the relative importance of initial settlement decisions of juveniles and any subsequent redistribution which may take place to adulthood. The relative importance of those two components has potentially a great effect on the chances of populations to adapt to environmental variability. Further understanding of these processes requires tracking of a large enough sample of individuals over long periods and at population-wide scales. With long-term tracking of hundreds of marked Icelandic Black-tailed Godwits across the non-breeding range from their first migration to adulthood we explore the structure of the settlement process. We evaluate the evidence for flexibility or constraint in the formation of the wintering distribution of a migratory bird and the likely demographic consequences of the process.

E6 Do residents outperform migrants? Implications of migratory strategy for individual fitness

Verónica Méndez¹, José A. Alves^{2,3}, Böðvar Þórisson², Tómas G. Gunnarsson² og Jennifer A. Gill¹

¹*School of Biological Sciences, University of East Anglia*

²*University of Iceland, South Iceland Research Centre, University of Iceland*

³*Centro de Estudos do Ambiente e do Mar (CESAM), Universidade de Aveiro*
v.mendez@uea.ac.uk

One of the most widely reported responses to environmental and climatic change in recent years is changes in migratory behaviour of bird species, and particularly advances in the timing of migration and breeding in response to earlier spring warming. These advances may be a key mechanism influencing the relative fitness of migratory strategies, and driving changes in the frequency of residents and migrants. For example, earlier spring warming could benefit residents and early arriving migrants, if subsequent earlier nesting is more successful and/or if they have more time for replacement clutches following nest loss. Changes in migratory behaviour can thus alter the distribution and abundance of non-breeding population and the consequences will depend on (1) the implications for the relative fitness of individuals with differing migratory strategies and (2) the factors influencing the initiation and maintenance of individual migratory strategies. We address these issues in Eurasian oystercatchers breeding in Iceland, a partially migrant population where changes in the number of resident individuals have recently been observed. Here, we first explore the potential for stable isotope ratios of feathers to discriminate between migrant and residents, in order to increase the number of individuals to which migratory status can be assigned without resightings. We then discuss the implications of migratory strategy for individual fitness, by investigating the variation in timing of nesting, the frequency and timing of re-nesting, hatching and fledging success between residents and migrants.

E7 Importance of agricultural and semi-natural habitats for breeding waders in low-intensity farming landscapes

Lilja Jóhannesdóttir¹, José A. Alves¹, Jennifer A. Gill² og Tómas Grétar Gunnarsson¹

¹*Rannsóknasetur Háskóla Íslands á Suðurlandi*

²*University of East Anglia*

liljajoa@gmail.com

Agriculture is one of the primary threats to biodiversity but it can also provide key resources for many species, depending on its extent and intensity. In some parts of the world, agricultural land supports important populations of species of conservation concern, and even provides resources not available elsewhere. In these cases, it is particularly important to understand species' use of farmed land before further expansion or intensification of agriculture occurs. Icelandic agriculture is still relatively low-intense, and internationally important populations of several breeding bird species are abundant in farmed regions. In order to investigate the patterns of farmland use and surrounding natural land by breeding waders in these landscapes, we surveyed bird abundance at 64 farms. Specifically, we quantified levels of breeding bird use of land managed at three differing intensities and changes in patterns of use throughout the breeding season, and the consistency of patterns across regions and species. Breeding birds use all three management types in large numbers but, overall, bird abundance is lower in more intensively managed farmland. This suggests that, despite semi-natural areas supporting higher bird abundances overall, agricultural land can also provide important resources for breeding birds. Given the severe declines in breeding wader populations across the globe, this study highlights the importance of protecting these rare landscapes from future development.

E8 Hot and warm: consequences of rising temperatures for breeding and beyond.

Jose A. Alves^{1,2}, Tomas G. Gunnarsson¹, William J. Sutherland³, Peter M. Potts⁴ og Jennifer A. Gill⁵

¹*University of Iceland, South Iceland Research Centre*

²*Dep. Biology & CESAM, University of Aveiro*

³*Department of Zoology, University of Cambridge*

⁴*Farlington Ringing Group*

⁵*School of Biological Sciences, University of East Anglia*

jose@hi.is

Responses to climate change have been widely reported across the natural world. Most refer to phenological changes but the consequences of these changes for populations are largely unknown. In order to improve our predictions of future climatic effects on populations, a mechanistic understanding of how phenological changes may impact demography and distribution is needed. The migratory Icelandic black-tailed godwit has experienced a warming trend in temperature in its natal region throughout the past century, when annual mean temperature at the longest running weather station rose by 1.2°C. Concomitant with this warming, the Icelandic godwit population has increased and expanded throughout the country, colonizing new areas during each decade of the 20th century. Here we investigate how temperature can influence the timing of breeding season events (e.g. laying dates, incubation and chick rearing length) at the individual level. We then scale up to explore how timing of breeding season events can drive demographic parameters and how these can influence distribution changes (e.g. range expansion) at the population level. Our current understanding of the mechanistic links between climate-mediated phenological changes and potential cascading effects on population demography and distribution need much attention if predictions of species responses to climate change are to be improved.

E9 Temporal flexibility on breeding and migration of Icelandic Whimbrels and potential consequences for reproduction

Camilo Carneiro^{1,2}, Tómas G. Gunnarsson² og José A. Alves^{1,2}

¹*CESAM, Dep. Biology, University of Aveiro*

²*South Iceland Research Centre, University of Iceland*

camilofcarneiro@gmail.com

In order to understand variation on ecological patterns such as timing of annual cycle events, most approaches have thus far looked at changes on the species or population level, but changes at individual level are likely more relevant for a mechanistic understanding of such processes. Several migratory birds show advances in laying dates due to warming temperatures and although wader populations show some flexibility, individuals tend to be highly consistent. However, at high latitudes, where breeding conditions are only suitable for a short period of time, it might be expected that individuals lay as early as possible in order to maximize the available time for successfully raising young. The Icelandic Whimbrel (*Numenius phaeopus islandicus*) is a long distance migrant that breeds in Iceland and winters in West Africa. The Icelandic summers of 2015 and 2016 were considerably colder and warmer than average, providing a unique opportunity to investigate the flexibility in timing of breeding, as well as, migration timings (for individuals tracked with geolocators) and their potential effect on breeding success. Here we explore the flexibility in timing of breeding, the consistency in timing of migratory stages and the potential effect of spring migration on breeding success.

E10 Dublin distrust and Reykjavik risks: Annual cycle of stress in arctic breeding long distance migrant

Freydís Vigfúsdóttir^{1,2} og Stuart Bearhop²

¹*University of Iceland*

²*University of Exeter*

freydisv@hi.is

It is thought that non-lethal effects of predation may play a far more important role in determining the behaviour, condition, density and distribution of animals. This is because the avoidance behaviour associated with fear is costly itself, as it can result in lost foraging opportunities, increased energy expenditure and stress. Hence fear can limit access to resources, influencing body condition, and thus has potentially significant consequences for fitness. Urban environment is home to numerous migratory bird species and may offer relatively stable overwinter feeding habitats such as parks, golf courses and gardens. However, such feeding grounds are often under high level of disturbance leaving the animals to evaluate of the risk of staying put and keep foraging or to flee the threat. In this study we investigate individual, context-dependent risk management in a wild population of a migratory bird species, light-bellied Brent geese (*Branta bernicla hrota*), breeding in Canadian high arctic, staging in Iceland and overwintering in urban areas of Ireland. We predict that individuals will be more tolerant of disturbance in spring because of the requirement for fuel deposition, but in turn may express heightened stress levels during this period as the cost of fear. We explore how fear is moderated according to the context in which the threat is delivered; why individuals might vary in the ways in which they respond behaviourally and physically (i.e. via measures of condition and stress hormones). We discuss the fitness consequence of individual variation in fear in relation to the trade off between food and safety as mediated by endogenous fat reserves and stress hormones and hypotheses about adaptive risk management by individuals.

E11 Gyrfalcon demographics revealed by non-invasive genetic sampling

Kristinn P Magnússon

Icelandic Institute of Natural History

Faculty of Natural Resource Sciences, University of Akureyri

kpm@unak.is

Demographics and dispersal of the gyrfalcon are highly important aspects of the life-history of the gyrfalcon (*Falco rusticolus*) and have academic and practical values. The academic values relate to predator-prey interaction and how this affects survival of the predator, and dispersal in context of population genetics. The practical values relate to the management and conservation. Presently it has not been possible to do such studies on gyrfalcons using traditional methods of tagging and recapturing birds. Non-invasive genetic techniques now offer a way to recognize individuals using life samples such as shed feathers, samples that are easily collected. This offers an exciting possibility to study both dispersal and demographics within a gyrfalcon population. We have designed three multiplex assays with 13 known microsatellite loci to determine genetic diversity and population structure of the gyrfalcon. These assays facilitate analysis of small amount of DNA and enhance genetic tagging of gyrfalcon when using shed feathers as a source of genetic material. We have used these assays in a pilot study to genotype DNA isolated from shed feathers obtained from 5 gyrfalcon territories in north-east Iceland, spanning 30 years. All feathers were also gender determined with PCR. Individual tagging of the feathers revealed both longevity of individuals and their territorial faithfulness. This shows that our material can be used for the purpose of individual identification of gyrfalcons.

E12 The effect of whole stream warming on emergence time of aquatic insect species

Gísli Már Gíslason¹, Soila I.S. Silvonon¹, Þóra Katrín Hrafnisdóttir² og Aron D. Jónasson¹

¹*Háskóli Íslands*

²*Náttúrufræðistofa Kópavogs*

gmg@hi.is

To predict responses to stream water warming, we studied insect emergence for two summers in the upper reach of a spring-fed stream (5.8°C) and heated up lower reach (9.1°C) of the same stream. For comparison a warm stream (19-22°C) was studied simultaneously. Density and diversity of emerging insects was greater in the heated reach than the unheated reach, especially during the first summer. Some chironomid species are absent in the heated reach (*Orthocladius frigidus*, *Chaetocladius laminatus*, *Diamesa aberrata*), while other were only present in the heated reach (*Rheocricotopus effusus*, *Paraphaenocladus impensus*, *O. fuscimanus*, *Micropsectra atrofasciata*). Species found in both reaches had an earlier emergence and/or had more emergence periods in the heated reach (*Thienemanniella* sp., *Eukiefferiella claripennis*, *E. minor*, *Parochlus kiefferi*), than in the cold reach. *Metriocnemus eurynotus* was unaffected by the water heating. Other aquatic insects (other Diptera species and caddisflies (Trichoptera)) were not as numerous as chironomids, but emergence activity will be shown. Warming up stream water by 3.3°C altered densities and diversity of emerging chironomids, their life histories and species composition.

E13 Modern Ostracod Distribution in Icelandic Lakes

Jovana Alkalaj¹, Steffen Mischke¹, Þóra Katrín Hrafnadóttir², Finnur Ingimarsson² og Robin James Smith³

¹*University of Iceland*

²*Natural History Museum of Kópavogur*

³*Lake Biwa Natural History Museum*

joa16@hi.is

Ostracods are a group of small crustaceans, usually around 0.5 to 2mm in length, that inhabit almost all aquatic environments. One of their major defining features is a hard, bivalve, calcitic shell, dorsally connected and encasing the entire body of the individual. Many ostracod species are especially sensitive to certain aspects of their habitat and have their ecological limits controlled by parameters such as water salinity, temperature, oxygen content, water depth etc. These factors, along with the fact that their shells readily leave fossil traces, make them useful as bioindicators, both in face of the current climate change, and as one of the proxies in the study of paleoclimate and paleolimnology.

Not much is known about ostracods in Iceland. The only currently available information comes from scattered records, some collected as far back as the end of 19th century, with most recent comprehensive limnological records omitting them from their scope. As such, the goal of this study is to fill this gap and improve the knowledge on the distribution of ostracods in Iceland as well as serve as a basis for numerous other applications that ostracods can offer, by giving a detailed and comprehensive overview of what species can be found in Icelandic freshwater bodies, coupled with detailed limnological information taken during the sampling. The study includes over 25 000 individuals taken from more than 100 localities, that have been analysed and identified down to the species level. Thirteen species have been identified so far, including some that have previously not been recorded in Iceland. These include some cosmopolitan species, such as *Candona candida* and *Cypria ophtalmica*, as well as species that are geographically more confined, such as *Tonnacypris glacialis*, a species that only inhabits the world's northernmost countries.

Preliminary results also indicate that the species composition might be tied to certain characteristics of the habitat, such as, for example, water depth, with species like *Cytherissa lacustris* being abundant in large, deep lakes, and almost non-existent in smaller, shallower waterbodies. The next step in the project will be to look at various parameters in relation to the species distribution and attempt to distinguish the species that could most reliably be used as bioindicators for Icelandic waters.

E14 The sediment and the midges: the effect from chironomid larval activities on lake sediment

Jón S. Ólafsson

Hafrannsóknastofnun

jsol@veidimal.is

Rykmý má finna í flestum búsvæðum ferskvatns. Hér á landi eru lirfur rykmýsins nær oftast ríkjandi meðal hryggleysingja í ám og stöðuvötnum. Á botni getur þéttleiki mýlirfa skipt þúsundum eða jafnvel hundruðum þúsunda einstaklinga á hvern fermetra botnflatar. Lífsferill rykmýs einkennist af löngu lirfustigi og stuttum tíma sem flugur. Lirfustig mýsins getur varað frá nokkrum mánuðum upp í nokkur ár, kynþroska flugur lifa þó aðeins í fáeina daga. Á lirfustiginu er mýið m.a. að finna innan um botngróður, á steinum eða niðurgrafnar í botnseti stöðuvatna. Í bontseti vatna bora lirfurnar sig niður í setið, þar sem þær klæða göngin að innan með silki sem þær spinna. Setið nýta mýlirfurnar sér ekki einungis sem búsvæði, heldur einnig sem fæðu. Fæðu lirfanna er að mestu að finna á yfirborði setsins, þangað sem þær sækja í þörunga, bakteríur eða annað lífrænt efni. Á lirfustiginu getur mýið haft umtalsverð áhrif á umhverfi sitt. Með því að styrkja pípur sínar að innan með silki auka lirfurnar stöðugleika setsins þannig að skerspenna setsins eykst. Með því að dæla súrefnisríku vatni niður í pípunar breyta þær oxunar-afoxunar spennu botnsetsins sem getur leitt til breytinga á oxunarástandi setsins og þar með pH-gildi setsins. Þetta getur síðan leitt til þess að flæði næringarefna milli sets og vatnsbols breytist. Því má segja að mýlirfurnar geti virkarð sem einskonar ventill á losun næringarefna úr seti. Í erindi mínu mun ég gefa yfirlit yfir áhrif mýlirfa á vistkerfi stöðuvatna.

E15 Warming responses of two native Icelandic plants *Ranunculus acris* and *Thymus praecox ssp. arcticus* in geothermal areas

Nia Sigrun Perron

University of Iceland

nsp4@hi.is

Global average temperature increases are estimated to range from 0.3 - 4.8°C by 2100, resulting in increased soil temperatures. Our objective is to determine how native Icelandic plants, *Ranunculus acris* and *Thymus praecox ssp. arcticus* respond to soil warming, and if their responses depend on elevation and/or time since warming. The study system is located within three geothermal sites (GN, GO & Hen). These areas provide natural temperature gradients within a small geographic area where soil temperature can be isolated from other variables i.e. space, time and biological complexity. Each site has soil temperatures ranging from 8°C to 48°C and exhibit differences in elevation and warming time. Plant phenology, fitness and functional traits were measured for both species at each site. Linear mixed models were used to determine the relationship between plant traits and soil temperature. Warming responses were species and site specific. At GN, temperature effected fitness (positive for *R. acris*, negative for *T. praecox*) and height (negative for *R. acris*, positive for *T. praecox*). At GO temperature had a negative effect on *R. acris* fitness, size and height and a positive effect on *T. praecox* phenology. In Hen temperature had a positive effect on *T. praecox* phenology but a negative effect on plant size. This is one of few studies determining the influence of soil warming on plant growth using natural thermal gradients and will help establish species tolerance to warming soils.

E16 The concept of the Icelandic Master Plan for Nature Protection and Energy Utilization and an integrated process based ecosystem approach to evaluating areas

Skúli Skúlason¹, Ása L. Aradóttir², Birna Lárusdóttir³, Gísli Már Gíslason⁴, Kristján Jónasson⁵, Sólborg U. Pálsdóttir⁶, Sólveig K. Pétursdóttir⁷, Tómas G. Gunnarsson⁸, Þorvaldur Þórðarson⁹ og Þorvarður Árnason¹⁰

¹*Department of Aquaculture and Fish Biology, Hólar University College*

²*Department of Natural Resources and Environment. The Agricultural University of Iceland*

³*The Institute of Archaeology, Iceland*

⁴*Faculty of Life and Environmental Sciences, University of Iceland*

⁵*Icelandic Institute of Natural History*

⁶*Archives of the Municipality of Skagafjörður, Iceland*

⁷*Matís ltd. - Icelandic Food and Biotech R&D, Iceland*

⁸*South Iceland Research Centre, University of Iceland*

⁹*Faculty of Earth Sciences, University of Iceland*

¹⁰ *Research Centre in Hornafjörður, University of Iceland*

skuli@holar.is

The Ministry for the Environment and Natural Resources in Iceland has been responsible for the creation of a Master Plan for Nature Protection and Energy Utilization since 1999, and a legislation in this regard was passed by the Icelandic Parliament (Althingi) in 2013. The Master Plan is based on a multi-criteria evaluation of the diverse values involved and the likely impact of proposed power plant developments in the highly diverse river and geothermal systems on the island. For proposed hydro power projects whole river basins are evaluated. For natural (i.e. geological and hydrological systems, landscapes and wilderness, ecosystems, plant and animal species and populations) and cultural values (i.e. archeological remains), estimations of diversity, rarity, size/fragmentation, international responsibility and information quality are made. The results are used to categorize areas and potential impacts of power plant operations into the following management classes: 1) for conservation, 2) for 'on hold' (e.g. because knowledge is lacking or other less detrimental ways of utilization being considered) and 3) for utilization. Conservation class means that areas should be permanently protected from energy developments. To become operational the Master Plan proposals have to be accepted by the Icelandic Parliament. In this talk we will explain how this is performed, and in particular how an integrated ecosystem and process based approach is used to evaluate diversity.

E17 The microbial ecology of the Öxarfjörður gas seepage pockmarks

Oddur Vilhelmsson^{1,2}, Guðný Vala Þorsteinsdóttir¹ og Anett Blischke³

¹*The University of Akureyri*

²*The University of Iceland Biomedical Center*

³*Iceland Geosurvey*

anb@isor.is

Natural gas seepage pockmarks are found on the seafloor in Öxarfjörður bay, as well as on shore at Skógalón and Skógakíll. They are thought to harbour a diverse microbiota and are continuously flushed with natural gas composed of short-chain alkanes and simple aromatics. They thus present a rich environment for investigating natural populations of microbial degraders of alkanes and aromatic compounds. The two sites differ widely in terms of vegetation and geothermal input, with the Skógalón site being mostly barren and strongly impacted by geothermal activity, whereas the Skógakíll site is densely vegetated with no apparent evidence of geothermal activity. Community analysis by 16S rDNA tag sequencing of DNA extracted from seepage pockmark samples reveal a strong dominance of anaerobic, dehalorespiring bacteria from the class Dehalococcidia, suggesting a microbial ecosystem characterized primarily by anaerobic methane oxidation fuelled by reductive dehalogenation. Several facultatively dehalorespiring bacteria are also present among the cultured bacteria, which also comprise a large number of facultatively lithotrophic Alpha- and Betaproteobacteria, suggesting considerable biogeochemical activity in the pockmarks, such as bioweathering and biodeposition activities. Preliminary investigations on the bioremediation potential of the isolated bacteria from the seepage pockmarks at both sites have revealed degraders of naphthalene, hexane and propane.

E18 Examining growth and trophic patterns of Northeast Atlantic cod across a millenium

Guðbjörg Ásta Ólafsdóttir¹, Gróa Pétursdóttir², Hlynur Bárðarson² og Ragnar Edvardsson¹

¹*Rannsóknasetur HÍ á Vestfjörðum*

²*Hafrannsóknastofnun*

gaol@hi.is

The medieval and early modern periods were characterized by rapid increase in marine fisheries in the North Atlantic, at the same time as the climate cooled with the onset of the “little ice age” and subsequent temperature fluctuation. Reconstructing growth and trophic ecology of Northeast Atlantic cod in this period is therefore of particular interest. In the current study, we examine Atlantic cod otoliths and vertebrae from an archaeological excavation of a historical fishing site in NW-Iceland, dated to AD 970 – AD 1910. First, we use otoliths to estimate and examine change in growth curves and second, we examine stable isotope values $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ from the cod vertebrae. There was a notable reduction in size at age during the 17th century and this was primarily explained by reduced juvenile growth and conversely slower adult growth during the warmer periods. Growth reconstructions coincide with trophic and environmental patterns, as inferred from stable isotopes. We discuss these findings in context of historical documents describing fishing and local climate. The temporal resolution and scale of the current results allows a valuable baseline for modern fisheries science focusing on Atlantic cod.

E19 Trophic Vulnerability of 0-Group Atlantic Cod (*Gadus morhua*) and Saithe (*Pollachius virens*)

Anja Nickel

Rannsóknasetur Háskóla Íslands á Vestfjörðum
anja14@uw.is

This study examines the trophic vulnerability of 0-group Atlantic cod (*Gadus morhua*) and saithe (*Pollachius virens*) during late summer and fall 2015. This period coincides with the Atlantic cod juvenile settlement from the pelagic to the benthic habitat in the northwest of Iceland. It is a critical period for both species as growth in the first summer and fall may determine winter survival. In the current study, the diet of 0-group cod and saithe has been analyzed during this critical settlement period and used to discuss the relevance of trophic preferences and trophic competition for nursery grounds in the shallow coastal waters. Tissue samples have been taken for stable isotope analysis to describe distributional patterns during the settlement stage and to investigate the niche breath in the feeding habitats of the juvenile cod and saithe. The feeding patterns of the 0-group juveniles revealed that both species are opportunistic feeders with a wide range of prey organisms. Despite that, there is high overlap in the foraging niche of cod and saithe, suggesting the potential for trophic competition between and within the two species. During the sampling period from late July until November, the proportion of benthic prey items gradually shifted until the diet mainly contained pelagic organisms. From late October on, cod and saithe feeding patterns started to diverge, which indicates more specialized foraging habits.

E20 Non-indigenous marine species in Icelandic waters

Ó. Sindri Gíslason¹, Guðrún G. Þórarinsdóttir² og Karl Gunnarsson²

¹*The Southwest Iceland Nature Research Centre*

²*Marine and Freshwater Research Institute*

sindri@natturustofa.is

During recent decades sixteen introduced marine species have been re-corded in Icelandic waters. Amongst them are six algal species, four crustaceans, two molluscs, two species of fish, one ascidian, and one hydrozoan. The majority of the species are likely to have been transported to Iceland with ships either as bio-fouling on the outside hull or in ballast water. Ballast stones or sand are proposed as a possible means of transport for some species. Most of the introduced marine species in Iceland are likely originated in Europe, as has been confirmed for three of the species by genetic comparisons with populations elsewhere in the North Atlantic. The Atlantic rock crab is the only species that can be said with certainty to have been introduced from the Northwest Atlantic. All the introduced species have been found in littoral or shallow water habitats. Most of the introduced species were first detected in south-western Iceland where the sea temperature is highest and the busiest harbours are located. In general only a small part of introduced species becomes invasive. Of the introduced marine species in Iceland *Heterosigma akashiwo*, *Gonionemus vertens*, the serrated wrack, Atlantic rock crab, European brown shrimp, the Sea vase tunicate, and the European flounder are considered invasive or potentially invasive.

E21 Biodiversity of bivalves and gastropods around Iceland

Hrönn Egilsdóttir^{1,2}, Niall McGinty³ og Guðmundur Guðmundsson⁴

¹*Institute of Earth Sciences, University of Iceland*

²*Marine and Freshwater Research Institute*

³*Mathematics and Computer Science, Mount Allison University*

⁴*Icelandic Institute of Natural History*

hre2@hi.is

We describe and compare the diversity of bivalves and gastropods along the bathymetric gradient north and south of the Greenland-Iceland-Faroe (GIF) topographic ridge, which separates the Nordic Seas from the bulk of the North Atlantic. Patterns of α -diversity were estimated as E(S20). Regional and depth related β -diversity was analysed and the additive contribution of turnover (species replacement) and nestedness (species loss/gain) to β -diversity calculated using a novel approach. Despite a significant number of shared species, the diversity patterns varied between the regions and moderately between bivalves and gastropods. North of the GIF ridge, species loss with increasing depth resulted in a predominant decrease in bivalve and gastropod α -diversity between 300 and 2000 m depth. Accordingly, species assemblages in the lower bathyal zone were partly nested subsets of the assemblages in the shallower bathyal zone. Nestedness resultant dissimilarity contributed to a greater proportion of β -diversity in bivalves north of the GIF ridge compared to gastropods. South of the GIF ridge, α -diversity decreased with depth in bivalves, with no clear trend in gastropods. This finding contradicts the recognized increase in α -diversity in the bathyal zone in the North Atlantic basin, perhaps due to the particular oceanographic regime directly south of the GIF ridge. Species turnover dominated β -diversity south of the GIF ridge.

E22 Herbivory by sheep and insects during primary succession

Bryndís Marteinsdóttir¹, Kristín Svavarsdóttir² og Þóra Ellen Þórhallsdóttir¹

¹*Háskóli Íslands*

²*Landgræðsla Ríkisins*

bryndism@hi.is

Under harsh growing conditions, like in primary succession, herbivores that remove plant biomass and reduce plant fitness are likely to have a large impact on vegetation development. In this study we evaluate the impact of light sheep grazing (<0.01 sheep ha⁻¹) and insect herbivory on plant succession on Skeiðarársandur, a 1000 km² glacial outwash plain in SE-Iceland. While parts of Skeiðarársandur have continuous vegetation, most of it has <10% vegetation cover. Ecosystem development has been studied there since 1998 and in 2004, 10 large plots were fenced to exclude sheep grazing. We examined if exclusion of grazing influenced plant community composition and the size and fitness of three common plant species, *Cerastium alpinum*, *Arabidopsis petraea* and *Juncus trifidus*. In addition, we estimated the effect of insect herbivory on the plants. To determine the importance of sheep in seed dispersal we studied seed germination from sheep dung and used GPS-collars to follow sheep movement. Our results indicate that even such a low stock rate has a significant negative effect on plant growth and seed production. Sheep are efficient seed dispersers and have the potential to disperse seeds over a long distance (> 10 km). The effect of insect grazing varied among plant species, for *J. trifidus* over 95% of seeds were predated on in 2016 but < 5% for *A. petraea*. This study shows that sheep and insects have a considerable impact on vegetation development in primary succession.

E23 Reindeer summer grazing and small rodent winter disturbance: herbivores modify nutrient dynamics in tundra plants

Matteo Petit Bon^{1,2}, Katarina Gunnarsdotter Inga², Freja Fagerholm², Tove Aagnes Utsi², Ingibjörg Svala Jónsdóttir^{1,3} og Kari Anne Bråthen²

¹*UNIS - The University Centre in Svalbard*

²*UiT - The Arctic University of Norway*

³*University of Iceland*

kari.brathen@uit.no

In Fennoscandia, the impact of reindeer on vegetation is evident. However, small rodents, such as voles, can act in concert with reindeer in influencing vegetation dynamics and, in turn, ecosystem processes. Rodents can cause disturbance to the vegetation throughout the year since they remain active during the entire winter period under the snow cover. In summer 2015, we conducted a 1-year reindeer exclusion experiment in alpine tundra meadows in Finnmark, Northern Norway. In addition, small rodent winter disturbance was employed as a quasi-experimental factor to disentangle the role of these herbivores in determining nitrogen (N) and phosphorous (P) content in tundra plant leaves. Sampling in 7 occasions along the season allowed us to test for seasonality effects on nutrient content in plants. Seasonal development was the strongest predictor of plant nutrient content for all plant functional types (PFTs). However, small rodent winter disturbance significantly increased N and P leaf content across all PFTs, and the patterns were consistent throughout the entire summer season. Reindeer exclusion affected leaf nutrient content only where also small rodents had disturbed the vegetation over the winter. Our results suggest a strong interplay between seasonality and herbivory in determining plant nutrient dynamics in tundra ecosystems.

E24 Reindeer in East Iceland. Shifting summer ranges and changes in calving areas around Snæfell. The effects of Kárahnjúkar hydroelectric project.

Kristín Ágústsdóttir, Skarphéðinn G. Þórisson og Rán Þórarinsdóttir

Náttúrustofa Austurlands

kristin@na.is

The largest hydroelectric project in Iceland was carried out the Eastern highlands from 2002 to 2013, in the heart of known summer ranges and calving areas of Snæfellsherd. Roads were built and disturbance increased in the previously pristine environment. Reindeer were monitored during calving and in summer ranges to explore possible effects of the construction in the area. Cows equipped with GPS collars gave information on if, and how animals were affected by infrastructure. During the construction period the reindeer population in Iceland increased by 50% while the population in the study area decreased by 29%. The changes were considered to be due to milder winters, increased hunting pressure and emigration to adjacent areas. Summer ranges shifted a few times during the construction period and calving areas changed as the cows moved to other non-adjacent areas. No negative effects were documented on the recruitment or the physical conditions of the animals. Animals with GPS collars showed a tendency to avoid infrastructure, such as roads and mountain huts, during calving and hunting season. Changes in behavior and distribution of reindeer are subject to a complex interaction of many factors, e.g. climate variability, human disturbance, changes in vegetation, changes in population size and density. As no baseline study for animals with GPS collars was available prior to constructions in the area it was difficult to determine the effects of construction and human disturbance alone.

E25 Restoration as a tool for ecological research

Ása L. Aradóttir

Landbúnaðarháskóli Íslands / Agricultural University of Iceland
asa@lbhi.is

Ecological restoration is the process of assisting recovery of degraded ecosystems. Restoration can have different objectives with regard to community composition, structure and function, as well as the provision of ecosystem services. In planning restoration we predict which factors limit succession and ecosystem recovery towards the set objectives — our hypotheses — and select interventions to overcome the limiting factors. Ecological succession following the restoration interventions is essentially a test of that hypothesis. Many ecological concepts apply to restoration, including disturbance, succession, resilience, competition, facilitation, niches, recruitment limitation, community assembly, island biogeography, ecosystem functions and soil formation. Furthermore, the practice of restoration allows experimental manipulation at a much larger scale than is generally possible in ecology, hence increasing realism compared to small-plot experiments. The presentation gives examples of recent restoration research that has improved our understanding of ecological processes and briefly discusses their application in practical restoration work.

E26 Fræslægja (e. green hay) sem uppgræðsluaðferð

Járngerður Grétarsdóttir

Landbúnaðarháskóli Íslands

jarngerdur@lbhi.is

Sífelld aukin áhugi er á að nota náttúrulegan gróður við uppgræðslu eftir ýmiskonar jarðrask, s.s. bygginga- og vegafamkvæmdir, einnig stígagerð og aðrar framkvæmdir t.d. á ferðamannastöðum og náttúruperlum en aðferðafræði við slíkt hefur vantað. Í erindinu verða kynntar niðurstöður tilrauna þar sem prófað var að magndreifa innlendum plöntutegundum með nýlegri aðferð sem nefna má söfnun og dreifingu fræslægju (e. green hay, seed-containing hay). Kynntar verða niðurstöður tilrauna með aðferðina á Hellisheiði 2007-2009 og á Keldnaholti-Korpu og Gunnarsholti 2015-2016. Aðferðin felst í að safna fræjum og öðrum fjölgunareiningum plantna með því að slá villtan jurtkenndan gróður á gjafasvæði að hausti og flytja fræslægjuna strax (án þurrkunar eða annarar meðhöndlunar) og dreifa á raskað svæði. Slægjan margfaldar fræmagn og mosabrot, miðað við sjálfuppgræðslu, sem haldast á yfirborðinu og flýttir gróðurframvindunni. Helstu tegundir sem hægt var að sá og magndreifa á þennan hátt í tilraununum voru: blávingull, kornsúra, vallhæra, gulmaðra, lokasjóður, ilmreyr, kattartunga, túnvingull, língresi (*Agrostis sp.*) og einnig algengar mosategundir í graslendi. Aðrar tegundir í minna magni voru t.d. hvítmaðra, ljónslappi, vegarfi, skarífífill, blóðberg. Um gróðurmælingar á 1-2 ára fræslægjusáningum var að ræða en lengri reynsla er á notkun aðferðinnar erlendis og oft mælt með henni við endurheimt náttúrulegs gróðurs. Gjafasvæðin jöfnuðu sig fljótt líkt og eftir venjulegan túnslátt.

E27 CO₂ evolution in highland soils of different land cover types in Iceland

Utra Mankasingh¹, Guðrún Gísladóttir^{1,2} og Jóhann Þórsson³

¹*Institute of Life and Environmental Sciences, University of Iceland, Reykjavík, Iceland*

²*Institute of Earth Sciences, University of Iceland, Reykjavík, Iceland*

³*Landgræðsla ríkisins, Gunnarsholt, Iceland*

utra@hi.is

Soil respiration is a key ecosystem process that releases carbon (C) from soil as carbon dioxide (CO₂). It can be influenced by temperature, land use and land cover change. The release of CO₂ from soils of the south Icelandic highlands (318-356 m above sea level) was investigated in a laboratory incubation study at 5, 15 and 25°C for field moist soils (root layer, 0-5, 5-10, 10-20, and 20-30 cm) to study mineralization of soil organic carbon (SOC) to CO₂. Soils were collected at 12 sites from three land cover types, categorized by plant communities: grasslands (G1-G8), with moss, *Carex Bigelowii* and dwarf shrubs; a sandy fluvial wetland (S), and sparsely vegetated gravels (M1-M3, 80% of the soil C would be largely untouched for hundreds of year if left undisturbed, and is likely to contribute to the net accumulation of C that is characteristic of Andisols.

ÁGRIP VEGGSPJALDA / POSTER ABSTRACTS

V1 Applying state-and-transition models to Iceland: an agenda for grazing research

Isabel C Barrio¹, David S Hik², Jóhann Þórsson³, Kristín Svavarsdóttir³ og Ingibjörg Svala Jónsdóttir¹

¹*Institute of Life and Environmental Sciences, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland*

²*Department of Biological Sciences, University of Alberta, Edmonton, Alberta, T5N 0R5, Canada*

³*Landgræðsla Ríkisins, Gunnarsholt, 851 Hella, Iceland*

icbarrio@gmail.com

Current landscapes in Iceland have been shaped by natural processes associated with harsh environmental conditions and frequent volcanic activity, and by human influence, through clear-cutting and livestock grazing. Large grazing animals were introduced to Iceland by the first Norse settlers in the IX century, and their impacts have been associated to the extensive soil erosion and range degradation that we see today especially in the Highlands and within the volcanic active zone. Sheep grazing is a primary economic activity but the ecological impacts of past and current grazing practices have not been thoroughly evaluated and environmental monitoring programs are not yet in place. State-and-transition models (STMs) can provide an adaptive framework for understanding the ecology of complex ecosystems and guide research, monitoring and management efforts. The development of STMs to northern rangelands has been limited, despite their successful application to other ecosystems worldwide. Integrating the best available knowledge, we have developed an STM for rangelands in Iceland. This approach provides a deeper understanding of the set of states, transitions and thresholds in these ecosystems, and provides a framework for research into the social and ecological processes driving the system. State-and-transition models can help identify important knowledge gaps and facilitate setting specific and measurable goals for management and restoration.

V2 Genetic analysis of Thessaly and Skyrian horse populations, two rare indigenous Greek horse breeds.

Maria Mavrikidi¹, Athanasios Sassalos¹, Nikolaos Sdroulias², Athanasios Dalaklidis³, Amanda Simpson³, Nikolaos Kritikos³, Theodore Sdroulias², Antonios Kominakis¹ og Ariadne Loukia Hager-Theodorides¹

¹*Agricultural University of Athens*

²*Thessaly Horse Breeders Association*

³*The Skyrian Horse Society*

a.hager@aua.gr

There are six recognized indigenous horse breeds in Greece -Pindos, Thessaly, Crete, Andravida, Peneia and Skyros- all considered rare and/or under threat of extinction. During the last decade efforts have been made for their characterization and conservation. Nevertheless genetic data for all six breeds remains limited. In the present study, Thessaly and Skyrian horse populations (n=250 and 105 respectively) have been analyzed using 17 microsatellite markers. Genetic analysis included the estimation of the number of alleles per marker locus, the observed () and expected () heterozygosity rate and the Polymorphic Information Content (PIC). Deviations from Hardy-Weinberg equilibrium were tested and Wright's Fis index was also estimated as a measure of inbreeding. Finally, non exclusion probabilities (NexP) for parentage, identity and sibling testing were estimated. Our data suggest that both horse populations studied exhibited levels of genetic variability comparable to previously published domestic horse variability levels, based on the same microsatellite markers. Thessaly population exhibited higher variability compared to Skyrian. The panel of genetic markers used was found to be suitable for the performance of parentage testing in both breeds exhibiting high probability of exclusion values and therefore allowing for accurate testing of existing pedigree and the completion of missing genealogy information and facilitating currently underway conservation programs.

V3 Ástand lands og beit

Ólafur Arnalds

Landbúnaðarháskóli Íslands

oa@lbhi.is

Ástand lands (land condition) er alþjóðlegt, þverfaglegt viðfangsefni. Það endurspeglar stöðu lands miðað við virkni vistferla og þanþol vistkerfisins. Það er oft metið út frá a) getu (potential) viðkomandi svæðis, b) fráviki frá „eðlilegu ástandi“ sé það þekkt, og c) settu markmiði um endurheimt landgæða. Þættir sem algengt er að nota til ákvörðunar eru jarðvegsrof, gróðurhula, samsetning og framleiðni gróðurs, fræsetning, ísig, vatnsheldni og magn kolefnis og niturs í moldinni. Hrunin vistkerfi einkennast oft af virku jarðvegsrofi (þ.á.m. auðnir). Framleiðslugeta þessara kerfa er mjög skert og þau eru ekki talin hæf til beitar út frá vistfræði-, og umhverfisfræðilegum sjónarmiðum, fyrir utan að draga má um fjárhagslegan ávinning í efa. Það tekur áratugi eða árhundrað að endurheimta hrunin vistkerfi eftir aðstæðum. Umfangsmesta landýtingin á Íslandi felst í beit. Beitarrannsóknir á misleitum opnum úthagakerfum eru flóknar því samspil margra þátta ráða útkomunni á hverjum tíma. Þær eru mikilvægar til að auka skilning á beitarvistkerfum, en eru ekki fullnægjandi fyrir ákvarðanir um landnýtingu. Ástand lands endurspeglar oft langa nýtingarsögu og er mikilvægt tæki fyrir mat á beit. Hugtakinu „beitarþol“ í merkingunni „carrying capacity“ hefur verið hafnað af fjölmörgum beitarvistfræðingum sem faglega gildu hugtaki fyrri fjölbreytt opin beitar svæði. Ástandsmælingar eru megin aðferð til ákvörðunar um beit á slíku landi.

V4 Connecting economy and ecology through landscape restoration

Berglind Orradóttir¹, Hafdís Hanna Ægisdóttir¹, Ólafur Arnalds², Ása L. Aradóttir² og Jóhann Þórsson³

¹*UN University Land Restoration Training Programme*

²*Agricultural University of Iceland*

³*Soil Conservation Service of Iceland*

berglind@lbhi.is

Healthy ecosystems are the basis of our life and economy. Their degradation poses a serious threat to our future as is clear from the UN Sustainable Development Goals (SDGs) that frame the international agenda and policies until 2030. Reversing land degradation and restoring landscapes are one of the key components of achieving the SDGs. Outside the community of restorationists and land managers there is a lack of awareness on the functioning of ecosystems and the benefits they provide. To build such awareness among the business community involved in land use and management, the partnership of the European Network for the Advancement of Business and Landscapes Education (ENABLE) was established. The main goal of ENABLE is to develop education platform and material on integrated landscape management based on sustainable business models. The first output of the partnership is a seven week Massive Open Online Course (MOOC), launched in spring 2017, about the basic and indispensable knowledge on the interconnectedness of economy and ecology. The MOOC is directed at business students although open to all without any cost. The aim of the MOOC is to raise awareness of the problem of landscape degradation around the globe, and the ways in which businesses can be a part of the solution by creating business-driven landscape restoration initiatives. The partners in the ENABLE partnership are Erasmus University Rotterdam, Commonland, Spanish National Research Council, Estoril Global and UN University Land Restoration Training Programme.

V5 Host-parasite interactions and population dynamics of rock ptarmigan in Iceland

Ute Stenkewitz^{1,2}, Ólafur K. Nielsen¹, Karl Skírnisson² og Gunnar Stefánsson²

¹*Náttúrufræðistofnun Íslands*

²*Háskóli Íslands*

ute@ni.is

Populations of rock ptarmigan in Iceland fluctuate in multiannual cycles, recently with peaks every c. 5 years. Ptarmigan parasites and their relation to bird body condition (BCI) and population density were studied in NE Iceland, 2006-2012. From 632 collected ptarmigan, 630 (99.7%) were infected with at least one parasite species. Indices for the parasite community (16 sp.) and 6 pathogenic parasites were analysed. Juveniles overall had more ectoparasites than adults, but endoparasite levels were similar in both groups. Ptarmigan population density was associated with endoparasites, and in particular prevalence of a coccidian parasite *E. muta*. Annual aggregation level of this eimerid fluctuated inversely with prevalence. Both prevalence and aggregation of *E. muta* tracked ptarmigan population density with a 1.5 year time lag. Explanations include host specificity of this eimerid, host density dependent shedding of oocysts, and persistence in the environment. Ptarmigan BCI was negatively associated with *E. muta* prevalence and this eimerid was also positively associated with ptarmigan mortality and marginally inversely with fecundity. There were also significant associations between fecundity and chewing louse *A. lagopi* prevalence (negative), and mortality rates and nematode *C. caudinflata* (positive) and skin mite *M. islandicus* prevalence (negative). This correlational study provides strong evidence that *E. muta* could destabilize ptarmigan population dynamics in Iceland.

V6 Biological soil crust in the Icelandic highlands

Rúna Björk Smáradóttir¹, Stefan Bartram² og Ólafur S. Andr sson¹

¹*University of Iceland, Faculty of Life- and Environmental Sciences, Reykjavik, Iceland*

²*Max Planck Institute for Chemical Ecology, Jena, Germany*

rbs1@hi.is

The Icelandic highlands are mostly covered by cryptogams, including mosses, lichens and biological soil crusts (biocrusts). A significant portion of the vegetation cover in the Icelandic highlands is biocrust dominated by liverworts, mainly *Anthelia juratzkana*. Our aim is to characterize the microbial community structure and function of this biocrust, focusing on biological nitrogen fixation. In high latitude ecosystems cyanobacteria are the main nitrogen fixers via the enzyme nitrogenase. The mean annual temperature as well as the summer temperature in these ecosystems is low, and nitrogen input by precipitation, decomposition and mineralization is low. In addition to nitrogen fixation by the canonical molybdenum-based Nif nitrogenase we are focusing on the alternative vanadium-dependent Vnf nitrogenase system. The Vnf system is widespread and expressed in cyanolichens and moss-associated cyanobacteria in Iceland. Preliminary metagenome analysis of the biocrust indicates proteobacteria and actinobacteria as the most abundant bacterial phyla. About 4,5% of the reads can be assigned to the phylum cyanobacteria of which 40% belong to the nitrogen fixing Nostocales. We have confirmed the presence and activity of the Vnf nitrogen fixing system in the biocrust.

V7 Bioprospecting Geothermally Heated Intertidal Pools: Interesting targets for biotechnology

Sean Michael Scully

University of Akureyri

scully@unak.is

Geothermally heated intertidal pools are interesting targets for bioprospecting due to the intrusion of terrestrial freshwater as well as the influx of saline water and marine debris. Macro algae is a promising feedstock for biotechnological applications. Unlike terrestrial lignocellulosic biomass, macro algae lack lignin but contain a much broader range of polysaccharides. While commercially available solutions for the degradation of xylan and cellulose, enzymes for the degradation of polysaccharides found in macro algae such as laminarin, alginate, ulvan, and fucoidan. The aim of our work has been to bioprospect geothermally-heated intertidal pools north of Husavik for microbes producing 1,2-propanediol and/or glycohydrolases capable of degrading the polysaccharides found in macro algae species. The sampled geothermal pools ranged in temperature from 22 to 67°C; samples were collected and enriched on various polysaccharides (laminarin, ulvan, fucoidan, agar, alginate, cellulose) as well as single carbohydrates (glucose, L-rhamnose, and L-fucose). 194 isolates were obtained where then characterized using standard phenotypic methods, API 20E and API ZYM panels, and 16S rRNA. 59 of the isolates produced 1,2-PD from either glucose, rhamnose, or fucose. On isolate, strain CC5C, demonstrated strong potential as a 1,2-PD producing organism. Confirmation of the enzymatic activities of the isolates and selected polysaccharides is ongoing.

V8 The wintering population of Oystercatchers in Iceland

Böðvar Þórisson¹, Verónica Méndez ², José Alves^{1,2}, Kristinn H. Skarphéðinsson⁴, Svenja Auhaugé⁴, Sölvi Rúnar Vignisson⁵, Brynjúlfur Brynjólfsson⁶, Cristian Gallo⁷, Páll Leifsson⁸, Jennifer A. Gill² og Tómas Grétar Gunnarsson¹

¹*Rannsóknasetur Háskóla Íslands á Suðurland*

²*University of East Anglia*

³*University of Aveiro*

⁴*Náttúrufræðistofnun Íslands*

⁵*Þekkingarsetur Suðurnesja*

⁶*Fuglaathugunarstöð Suðausturlands*

⁷*Náttúrustofa Vestfjarða*

⁸*Eskifirði*

bodvar@hi.is

Many species of birds are so called partial migrants, where a part of the population is sedentary, remaining in the breeding grounds year-round, whereas another part of the population migrates. Icelandic oystercatcher (*Haematopus ostralegus*) is a partial migrant with the majority of individuals thought to migrate to coastal Europe during the winter. Integrated in a wider project which compares demographic parameters between migrant and resident oystercatchers, we undertook the first total census of the Icelandic wintering population. Previous estimates suggested that the wintering population may be around 5-6000 individuals. The census took place during late January and early February 2017 and was based on total counts on known and potential wintering sites of the species around Iceland. The preliminary estimate of the wintering population of Icelandic oystercatchers was around 11 thousand individuals which were mostly found on coastal areas in SW- and W-Iceland with smaller numbers elsewhere, particularly in SE-Iceland.

V9 Diversity of Bryozoans on the southern coast of Reykjanes peninsula in SW-Iceland

Ó. Sindri Gíslason¹, Hermann Dreki Guls² og Halldór Pálmar Halldórsson²

¹*The Southwest Iceland Nature Research Centre*

²*The University of Iceland's Research Centre in Suðurnes*

sindri@natturustofa.is

Bryozoa are a phylum of aquatic invertebrate animals, most of which are marine but freshwater and estuarine species exist. Bryozoans are small sessile filter feeders, colony forming coelomates typically about 0.5 mm long. In many marine habitats their colonies are conspicuous part of the sessile epifauna, from the intertidal reaches of rocky shores to depths in excess of 5000 m. Despite being small, where individuals are often inconspicuous, they occupy extensive areas of hard surfaces like rocks, shells and algae by their abundance under suitable conditions. Bryozoans play an important role in sediment stabilization and binding, as well as key roles in food chains, consuming microorganisms and in turn being prey for fish and other animals. Some species produce very large colonies that make the framework of significant and distinctive ecosystems. Limited knowledge is on Bryozoans in coastal waters around Iceland. In this study the diversity of Bryozoans was studied for the first time on the southern part of Reykjanes peninsula. Divers collected 16 holdfasts of the kelp, *Laminaria hyperborea*, at four stations at 6-10 m depth in the study area, Arfadalsvík. In total 24 species of Bryozoans were identified.

V10 Production of commodity chemicals from geothermal gases using hydrogen-consuming chemolithoautotrophs

Cyril Lemaire, Guðný Inga Ófeigsdóttir, Snædís H. Björnsdóttir og Sigurður Brynjólfsson

University of Iceland

cyril@hi.is

Geothermal gas is widely used in Iceland for the production of electricity. Power plants release this gas as waste into the atmosphere after harvesting heat. The gas components are mainly CO₂, H₂ and H₂S. Due to environmental regulations, the large quantities of H₂S previously emitted by the Hellisheiði power plant are now separated from the gas with a water scrubber. Thus, the current exhaust gas is predominantly a mixture of H₂ and CO₂ with low quantities of H₂S. This composition makes the gas an ideal natural resource for the production of biofuels and chemicals using fermentation technology. Acetogenic bacteria such as *Clostridium ljungdahlii* are known to grow on H₂ and CO₂ while producing acetate and ethanol via the Wood-Ljungdahl pathway. Depending on the conditions, some strains can produce other more complex multi carbon compounds. In this study, acetogenic bacteria isolated from areas around power plants will be examined for their capacity to convert gaseous waste into cost effective and sustainable commodity chemicals. For that, two experimental phases are required. First, microbes will be sampled in the Hengill area. A laboratory scale batch bioreactor will be used to enrich samples on a "model gas" to select interesting microbes and their ideal operational conditions. These results will be used to implement a fully equipped bioreactor at the power plant. Hence, we will be able to test the influence of variations in the natural gas on bioconversion efficiencies.

V11 Effects of climate warming and herbivory on rate of decomposition in low and high Arctic

Katrín Björnsdóttir¹, Isabel C Barrio¹ og Ingibjörg Svala Jónsdóttir^{1,2}

¹*Institute of Life and Environmental Sciences, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland*

²*University Centre of Svalbard (UNIS)*

katbjo@gmail.com

Predictions on climate change indicate that temperatures will continue to rise and these changes are expected to happen more rapidly in Arctic regions than in other areas of the world. Tundra ecosystems contain enormous amount of organic carbon and therefore play a crucial role in the global carbon cycle. If temperature changes follow current predictions, these carbon pools could potentially shift from being a sink to a source of CO₂ by the end of this century. The main aim of this study is to examine how climate warming and herbivory affect the rate of decomposition within contrasting bioclimatic sub-zones. The impacts of warming and vertebrate herbivory on the decomposition rate was assessed in different habitats in high Arctic Svalbard and sub-Arctic Iceland, using open-top chambers to enhance temperature or fences to exclude grazing. To estimate decomposition rate, we used two types of commercially available tea to represent dead plant material. The tea bags were buried into the ground and the rate of decomposition estimated as weight loss over three months. Excluding herbivory did not affect decomposition rate in Iceland but the effect of warming on decomposition differed significantly between high and low Arctic. Decomposition was higher in warmed plots in Iceland, but surprisingly the opposite occurred in Svalbard. The results of this study will provide information on how future responses to climate warming and increasing herbivory pressure will occur in the Arctic.

V12 Vöktun gróðurauðlinda

Jóhann Þórsson og Kristín Svavarsdóttir

Landgræðsla ríkisins

johann.thorsson@land.is

Í núgildandi búvörusamningi sem samþykktur var á síðasta ári er nú kveðið á um að koma skuli upp vöktunarverkefni til að meta ástand gróðurauðlinda. Í mars s.l. var gengið frá samningi milli atvinnuvega- og nýsköpunarráðuneytisins, Bændasamtaka Íslands, Landgræðslu ríkisins og Landssamtaka sauðfjárbænda um útfærslu þessa ákvæðis. Landgræðsla ríkisins tekur að sér umsjón verkefnisins og jafnframt skipar ráðherra fimm aðila í faghóp sem starfar með stofnuninni að framgangi verkefnisins. Þekking okkar á ástandi vistkerfa er mjög brotakennd. Miklar upplýsingar eru til um ýmsa flokkun gróðurs og vistkerfa, t.d. gögn Nytjaland Landbúnaðarháskólans og Vistgerðaflokkun Náttúrufræðistofnunar Íslands. Ákaflega litlar upplýsingar liggja þó fyrir um hvort landi sé að hnigna eða í framför þegar litið er til gróðurhulu og uppskeru sem er sú auðlind sem hefðbundin landnýting byggir á. Góðar upplýsingar um slíka þætti eru grundvöllur að sjálfbærri landnýtingu og þá jafnframt að traustum samfélögum sem byggja á nýtingu gróðurauðlindarinnar. Í þessu verkefni er bæði lögð áhersla á vöktun á ástandi gróðurs og nýtingu á hverjum tíma. Í ljósi þess að umhverfisbreytingar eiga sér stað á mismunandi mælikvörðum þá verður gögnum aflað með mælingum í reitum og sniðum og einnig gervitunglum og flygildum. Jafnframt verður lögð mikil áhersla á miðlun upplýsinga og samstarf við hagaðila. Verkefnið er vöktunarverkefni og mun gildi gagna þess því aukast jafnhliða því sem bætist í tímaseriúr gagnasafnsins.

V13 Endurheimt votlendis

Sunna Áskelsdóttir og Ágústa Helgadóttir

Landgræðsla ríkisins

sunna@land.is

Gildi votlendisvistkerfa eru margþætt. Þau eru mikilvæg búsvæði fugla, fiska, smádyra og plantna. Að auki veita þau mikilvæga þjónustu við temprun flóða, miðlun næringarefna, hreinsunar vatns og geymslu kolefnis. Við framræslu votlendis kemst súrefni að því lífræna efni sem hefur safnast saman í árþúsundir með þeim afleiðingum að það tekur að rotna. Við það losnar koltvísýringur út í andrúmsloftið og áætlað er að sú losun sé árlega um 24,5 tonn koltvísýringsgilda ha. Því er til mikils að vinna með verndun og endurheimt votlendis. Landræn votlendi þekja um 20% af grónu flatarmáli Íslands og ætla má að um helmingur þess eða um 4.200 km² hafi verið raskað með framræslu. Framræst land utan túna og skóglendis er því áætlað um 3.600 km². Ráðist hefur verið í um 40 endurheimtarverkefni héraðs á vegum ýmissa aðila og hefur Landbúnaðarháskóli Íslands frá upphafi sinnt rannsóknum á áhrifum framræslu og endurheimt votlendis. Árið 2016 var Landgræðsla ríkisins falin framkvæmd endurheimtar votlendis í samræmi við Sóknaráætlun ríkisstjórnar Ísland í loftslagsmálum. Unnið var á 8 svæðum sem spönnuðu um 1 km². Landgræðslan veitti ráðgjöf við framkvæmd og vaktaði árangurinn og breytingar á vatnshæð. Á árinu 2017 er áætlað að fara í frekari framkvæmdir en jafnframt að leggja meiri áherslu á forkönnun, mat og vöktun þeirra svæða sem endurheimt verða.

V14 The International Arctic Science Committee – IASC

Ingibjörg Svala Jónsdóttir^{1,2} og IASC Secretariat³

¹*University of Iceland*

²*University Centre of Svalbard*

³*the IASC Secretariat, Akureyri*

isj@hi.is

IASC (iasc.info) is a non-governmental, international scientific organization. Its mission is to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic region. Overall, IASC promotes and supports leading-edge multi-disciplinary research in order to foster a greater scientific understanding of the Arctic region and its role in the Earth system. The core elements of IASC are its five working groups: Terrestrial, Marine, Atmosphere, Cryosphere and Social&Human. The working groups assist IASC in implementing its mission by initiating, coordinating and promoting scientific activities at a circum-Arctic or international level; acting as scientific advisory board for the IASC council; promoting the next generation of scientists working in the Arctic.

The IASC secretariat recently moved from Potsdam, Germany to Akureyri. The Icelandic member organization is Rannís.