

Arctic Entomology under Climate Change

NOVA PhD course of 3 ECTS, organised by Ass. Prof. Guðmundur Halldórsson, Agricultural University of Iceland.

Course dates and location: 20-24 August, 2018 in Gunnarsholt, the headquarters of the Soil Conservation Service of Iceland, Hella (S Iceland)
<https://www.land.is/english/>

The course is the second in the NOVA PhD course series "Climate Change Entomology in the North", scheduled during 2017-2019.

Course Description

The series "Climate Change Entomology in the North" focuses on the fundamental and drastic demands in agricultural entomology in the Nordic countries, caused primarily by climate change. The effects of climate change are occurring at a faster and stronger rate in the Arctic than elsewhere in the globe. We are already observing changes in phenology, species distributions and ecological interactions in natural and agricultural systems in the North. Given the short growing seasons, agricultural production at high latitudes may benefit from a warmer Arctic, but so will insect pests from lower latitudes that will be able to expand northwards. In this course, we will explore the consequences of ongoing and predicted environmental changes on Arctic entomofauna, from individual to community responses, and the implications to agriculture and forestry.

Content

In this course, we will train the students to understand the consequences of environmental changes on Arctic insects, and the implications of these changes to agriculture and forestry in Nordic regions. The course will combine lectures and hands-on training in the field on methods to monitor insect populations and evaluate population changes.

Programme Outline

- Pre-campus assignments: reading materials
- Lectures and interactive seminars on drivers and consequences of climate change to Arctic entomofauna, from individuals, to populations, species and communities, and the implications to Nordic agriculture and forestry.
- Lab-work, demonstrations, and field assessments concerning e.g., methods for monitoring insect communities and ecological interactions, such as herbivory or pollination.
- Field trip related to methods to monitor insect populations and their changes

Pre-/Post-Campus Assignments

In-depth background literature assignments, eventual case study preparation.

Learning Outcomes

1. Up-to date knowledge of the mechanisms through which ongoing environmental changes affect Arctic insects, agriculture and forestry.
2. Appreciation of the complexity of the ecological mechanisms involved in the responses of Arctic insects to climate change
3. Insights into possible avoidance, mitigation, and remedy measures that can be applied, including the need for international collaboration and coordinated actions
4. Inspiration, techniques and tools for students to conduct research in the topic areas covered by the course series

Evaluation Elements

- Quality of pre-course assignment feedback
- Level of engagement and participation during the course-week
- Evaluation of individually acquired knowledge during our final interactive session

Pedagogical Approach

- Problem-oriented learning
- Positive feedback and learning within study groups
- Hands-on training of key concepts in the lab and in the field

Estimated Workload

- 15 hours of lectures
- 15 hours of lab and field work
- 10 hours of seminars
- 50 hours of independent work

Prerequisite Knowledge

Basic and advanced courses in applied entomology, environmental sciences, and ecology.

Admission

Admission for NOVA courses is handled by the course organiser and the NOVA member institution organising the course. Please see the links in the margin for more information.

Course application deadline: May 31, 2018

Tentative course schedule

Sunday 19 August 2018

Arrivals in Keflavík, travel to Gunnarsholt (approx. 2 hr), accommodation in dormitories

Monday 20 August 2018

9:00	Introduction to the course series	HH
9:05	Introduction to the course	GH
9:10	Icebreaker: brief introduction of participants	
9:30	Lecture 1. Ecosystem services provided by insects in the North	HH
10:30	Coffee break	
10:40	Lecture 2. Arctic agriculture and climate change	IMH
11:30	Lunch	
12:20	Lecture 3. Adaptation of pest insects to northernness	LL
13:30	Lecture 4. Diversity and biogeography of Arctic insects	TTH
14:30	Outdoor activity. Using camera traps to monitor insect activity in the field	TTH, ICB, Leo, Elina
18:30	Dinner	

Tuesday 21 August 2018

9:00	Lecture 5. Pesticides facilitating pest invasions	LL
10:30	Coffee break	
10:45	Student presentations relating to Lecture topics 3-5; max 4 presentations	

11:30	Lunch	
12:20	Lecture 6. –Arthropod life history responses to climate change	TTH
13:30	Outdoor activity. Geothermal areas as natural warming experiments	BDS, others
18:30	Dinner	

Wednesday 22 August 2018

9:00	Lecture 7. Winners and losers of Arctic climate change: arthropod population and community dynamics associated with recent climate change	TTH
10:20	Coffee break	
10:40	Lecture 8. Species interactions: insect herbivory in the North	ICB
11:30	Lunch	
12:30	Student presentations related to Lecture topics 6-8; max 4 presentations	
13:30	Break	
14:00	Lab work. Image based exercise	TTH, ICB, Leo, Elina
18:30	Dinner	

Thursday 23 August 2018

9:00	Lecture 9. Range expansions, introductions and invasive insects	LL
10:00	Coffee break	
10:20	Lecture 10. Climate change and forest entomology in the north	GH
11:30	Lunch	
12:30	Student presentations: results on exercise on the previous day, plus required readings relating to Lecture topics 9 and 10.	
13:30	Outdoor activity. Witnessing change – excursion to Sólheimajökull glacier foreland	ALL
18:30	Dinner	

Friday 24 August 2018

9:00	Round-table discussion and wrap-up of the course topics: collation of student contributions, 1 page long, aiming at a popularizing article in a suitable media outlet; formulating of UArctic press release	HH, GH, all
10:20	Coffee break	
10:40	Course exam and evaluation	ALL
11:30	Lunch	
	Departure to Keflavík airport	

BDS = Bjarni Diðrik Sigurðsson, GH = Guðmundur Halldórsson, HH = Heikki Hokkanen, ICB = Isabel C Barrio, IMH = Ingeborg Menzler-Hokkanen, TTH = Toke Thomas Høye, LL = Leena Lindström, Leo = Leo Laaksonen, Elina = Elina Hirvisalo