

Project information

Keywords

ecosystem monitoring, tundra, small rodents, foxes, herbivory, Russia

Project title

Yamal EcoSystem - Collaboration for monitoring of climate related ecosystem change on Yamal, Russia

Year

2019

Project leader

Dorothee Ehrich

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)

- Erkuta in the low Arctic (68.2°N, 69.1°E) - Sabetta at the border between the low and the high Arctic (71.2°N, 71.5°E)

Participants

- *Project leader: Dorothee Ehrich, UiT – The Arctic University of Norway*
- *Project participants in the Fram Centre: V.T. Ravolainen, Norwegian Polar Institute and T. Tveraa and A. Stien Norwegian Institute for Nature Research*
- *International participants: A.A. and N.A. Sokolov, Arctic Research Station of the Institute of Plant and Animal Ecology of Ural branch of Russian Academy of Sciences (IPAE UrO RAS), Labytnangi, Yamalo-Nenetsky AO, Russia; S.Y. Sokovkina, IPAE UrO RAS, Russia.*

Flagship

Terrestrial

Funding Source

Fram Centre terrestrial flagship.

In addition we received funding from a related project from the Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education.

Summary of Results

In line with the proposal, we continued the collaborative work between Fram Centre Researchers working with COAT and the Arctic Research Station in Labytnangi (Yamal, Russia) on monitoring climate related changes in the tundra ecosystem on Yamal. This collaboration involved common field work at Erkuta and a meeting in Labytnangi in September right after the Herbivory Network workshop to which some of us attended. During the rest of the year we have regular skype meetings, and started also with a virtual journal club, where we discussed mostly papers related to herbivory and reindeer management in Scandinavia (relevant for target 3 from the project application).

In the beginning of 2019, the Arctic Research Station received 8 new positions for young scientists from a program of the Russian Government. The research group could thus be extended and has now grown to be interdisciplinary by including two anthropologists working with Nenets culture. Thanks to the new people, the monitoring activities can now be greatly increased and expanded to include to the socio-ecological system. It is nice to see that our collaboration over the years has contributed to the development of the research group, which resulted in their success in this program.

Additional financing was obtained for a two years project for student exchanges from the Norwegian Agency for International Cooperation and Quality Enhancement in Higher Education. This project is a collaboration between UiT, ARS and St Petersburg State University and aims at developing collaboration in education for future ecosystem-based monitoring of arctic tundra. As a result, a total of three master students (one from UiT and two from St Petersburg State University) could participate in field work at Erkuta and collect data for their master theses.

Regarding the specific monitoring targets, we continued to analyse the longer time-series available from Erkuta focusing on the numerical and functional response of rough-legged buzzards to the changes in dynamics and composition of the small rodent community (target 1).

Highlight: These data showed that the breeding density of an arctic bird of prey, the rough-legged buzzard, decreased when small rodents, its main prey, experienced a shift from high amplitude cycles to moderate fluctuations paralleled with a change in species composition towards less lemmings and more voles. At the same time, however, the birds still breeding had on average larger broods, suggesting that the population adapted to a certain degree to the changes in the major resource (Fufachev et al. 2019)

The arctic fox monitoring (target 2) was continued both at Erkuta and in Sabetta. In Erkuta, there was an unusually high proportion of arctic dens despite average small rodent densities. The high breeding activity was probably due to high small rodent densities in late winter, but the populations probably crashed before the summer because our trapping did not indicate more than average densities. In Sabetta, a site close to a large industrial settlement, we initiated a study of the role of anthropogenic versus marine subsidies for the foxes using stable isotopes. There is increasing concern among reindeer herders in Yamal that arctic foxes attack and kill reindeer calves. We started to investigate several hypotheses for this development, either an increased focus from the herders facing difficult times or increasing populations of foxes supported by subsidies in particular around the industrial settlement Sabetta.

Regarding target 3, we participated in organizing the herbivory network workshop in Labytnangi, which was an excellent occasion to discuss our ongoing work with a group of experts in the field. In particular we made some progress in analyzing the data from an enclosure experiment which aims at distinguishing the impact of large, medium-sized and small herbivores on tundra vegetation. Concerning our work towards assessing pasture quality by monitoring the body condition of reindeer, we investigated how reindeer herders traditionally evaluate body condition. This will lead to a comparative study including Nenets and Sami traditional knowledge, including assessment of how it is applied in the field. A publication about this is planned for next year.

Master and PhD-students involved in the project

Dag Aleksander Hutgren Olsen (master student UiT)

Violetta Filippova (master student St Petersburg State University, Russia)

Nikolay Sleptsov (master student St Petersburg State University, Russia)

Ivan Fufachev (PhD student, Perm State University, Russia)

For the Management

Observations from Sabetta indicate that anthropogenic subsidies from the industrial settlement may contribute to an unusually high breeding activity in arctic foxes, despite considerable efforts of the Yamal LNG company to prevent access to human waste. An alternative explanation is that the foxes benefit from marine subsidies as elsewhere in the Arctic. The initiated study using stable isotope will provide an answer to this questions, which will be useful for the handling of waste disposal in Sabetta.

Our work developing reindeer body condition measurements which are easily applicable in field situations typical for Yamal will hopefully be useful to carry large scale assessment of pasture quality through reindeer condition. But this is work which has only been initiated so far.

Published Results/Planned Publications

Peer reviewed publications (project participants in bold):

- Rheubottom SI, Barrio IC, Kozlov MV, Andersson T, Asmus AL, Baubin C, Brearley FQ, Egelkraut DD, **Ehrich D**, Gauthier G, ... , **Sokolov AA**; **Sokolova NA**, **Sokovkina SY**, et al. 2019. Hiding in the background: community-level patterns in invertebrate herbivory across the tundra biome. *Polar Biology* 10: 1881-1897.
- Pokrovsky I, **Ehrich D**, **Fufachev IA**, Ims RA, Kulikova O, **Sokolov AA**, **Sokolova NA**; Sokolov VA, Yoccoz NG. 2019. Nest association between two predators as a behavioural response to the low density of rodents. *The Auk* doi.org/10.1093/auk/ukz060
- **Fufachev IA**, **Ehrich D**, **Sokolova NA**, Sokolov VA, **Sokolov AA**. 2019. Flexibility in a changing arctic food web: Can rough-legged buzzards cope with changing small rodent communities? *Global Change Biology* 25:3669–3679.
- **Ehrich D**, Schmidt NM, Gauthier G, ... **Sokolov AA**, **Sokolova NA**, et al. 2019. Documenting lemming population change in the Arctic: Are we keeping the pace? *AMBIO*, 10.1007/s13280-019-01198-7; as part of a special issue of the Circumpolar Biodiversity Monitoring Program.

Report: Monitoring of the population of arctic foxes as an indicator of the state of it's natural habitat in the area of the implementation of the project Yamal LNG [in Russian].

Communicated Results

Workshop of the herbivory network in Labytnangi (Russia) 21-23 September 2019. Participated in the organization and in the workshop.

Popular articles presenting our results:

www.framsenteret.no/2019/11/klimaendringene-forer-til-ny-hverdag-for-fjellvaken/

www.forskning.no/framsenteret-fugler-klima/klimaendringene-forer-til-ny-hverdag-for-fjellvaken/1587620

https://americanornithology.org/why-do-rough-legged-hawks-nest-next-to-peregrine-falcons/?fbclid=IwAR3L2dyWEoAPLH582EJcgAE5P19Mq36ns9KklqcB2-yrrMRRt_zaVMffMZA

News features mentioning our work on Russian television. Channel Yamal region: <https://yamal-region.tv/news/38147/>

And Russia 1: <https://www.youtube.com/watch?v=6owbtpOcj7Q>

Interdisciplinary Cooperation

The project has this year clearly benefitted from interdisciplinary cooperation involving ecologists and anthropologists.

Budget in accordance to results

The funding from the Fram Centre was used according to the project plan. It covered one month of salary for DE to work with the project, fieldwork expenses for DE, some field equipment, a field assistant for six weeks and partly for a master student from UiT (Dag A. H. Olsen). It also covered expenses for attending the workshop in Labytnangi in September. This funding is essential to maintain our close collaboration.

Could results from the project be subject for any commercial utilization

No

Conclusions

Yamal EcoSystems is developing as a program for monitoring climate related ecosystem change on Yamal in close collaboration with COAT. Thanks to the significant expansion of our Russian partner institution, our work is now becoming more relevant for management, including interdisciplinary perspectives and local knowledge, and well integrated in International tundra monitoring networks (Ehrich et al. 2019; Rheubottom et al. 2019)