PolliClim

“Winter is not good for studying bees”

-Dr. Nielsen

A Sporadic Newsletter

Vol 4; December 2016

The PolliClim project is coming to an end and we have to wrap it all up by the end of March 2017. Our work in raspberry farms is about to be submitted and we have sampled a substantial amount of data on pollination in wild plant communities along environmental gradients. There is still a lot to do, also beyond the PolliClim period, but that is how things work.

What have we done lately?

The first PolliClim paper (Reitan & Nielsen 2015. “Do not divide count data with count data; a story from pollination ecology with implications beyond”) was published in PlossOne early in 2016. In June Andreas Rinvoll defended his master thesis “Pollinator Activity under Climate Change” where he focused on pollination by honeybees in raspberry farms and how honeybee activity was affected by temperature. I’m proud to say that his effort made him a good ecologist in the end and I’m sure his knowledge will come useful for society. He is currently working as a high school teacher.

For the 2016 field season in Norway we abandoned the raspberry farms and switched focus to wild plant communities. A common approach in climate change studies is to use environmental gradient as a “space for time approach”. The idea is to do field observations in areas with contrasting temperatures while keeping all other factors as constant as possible. As we know that temperatures are decreasing with elevation working along a slope is a common way of conducting such studies. Solveig and Arrian did their fieldwork in the alpine ski resort Norefjell, observing flower visits to wild raspberry and *Melampyrum* sp. at elevations ranging from 200 m.a.s.l. to 800 m.a.s.l. A French intern, Elora Sepulcri, visiting Ørjan Totland at NMBU joined them in the field and enabled them to gather even more data than originally planned. Their data matrix is now ready for use and we plan to get started on the statistical analyses in early January. Lisa just started on her master project in August, but decided to do her fieldwork already this summer. Her family has a house on Reinøya, just outside Tromsø and she observed flower visits to *Melampyrum* sp. and other plant species along a short, but real, elevation gradient spanning from sea level to 300 m.a.s.l. just behind the house (Fig. 1). Co-supervisor on her thesis is Bård-Jørgen Bårdsen at NINA, Tromsø. In late 2015 Ingvild left for Argentina to join Mariano’s team and work with pollination in Soy. She used a latitudinal gradient spanning 200km under the assumption that temperatures were higher closer to the equator. This was not the case and the number of pollinators observed was very limited. She tested out different sampling techniques and the focus of her thesis will change from climate change issues to sampling methodology. In August Julie returned from her life as a politician and she is now about to start her experiments on bumblebee behaviour and effects of neonicotinoids. Bumblebees will be flown in from Denmark in early January and we are confident that this time the setup will work.

Figure 1: The view from Lisa’s house at Reinøya. Note that the picture was taken at midnight!

In July Trond went to Lesvos to do observations on pollination on a Melon farm together with Thomas and his team. The data sampled on Lesvos will be combined with our data from raspberry in Norway to form a common paper illustrating the added value of doing parallel sampling.

In January 2016 Thomas Sawe started on his Ph.D. at NMBU with Dr. Nielsen as co-supervisor. He is currently doing fieldwork in Watermelon gardens in Tanzania, his home country. In August Dr. Nielsen and the rest of his supervisor team went to Tanzania to set up the sampling scheme and discus the practicalities of the fieldwork (Fig. 2). Thomas will be back in Norway early 2017 and I'm looking forward to see what he has accomplished.

Figure 2: Fieldwork in Tanzania at the foot of Kilimanjaro. Thomas (with his notebook), Ørjan, Samora and some local workers inspecting a watermelon garden.

Networking/visitors

Through his involvement in the COST Action SUPER-B Dr. Nielsen visited Mike Garratt at the University of Reading. Dr. Nielsen presented the PolliCLim project and our work on statistical analyses and sampling methodology both at the Centre for Agroecological Research and at a workshop of the Royal Entomological Society, organized by Mike. This fruitful *[sic]* collaboration has now resulted in a joint project (more on that below). The annual meeting of the Management committee in SUPER-B was held in Cluj, Romania and Dr. Nielsen attended this time. Beers were served in one litre glasses and both the social and scientific sides of the meeting was enjoyed in full!

Work in progress

Adrian and his colleague Mani has, together with Trond and Dr. Nielsen, worked on a paper on bee vision and pan traps. Data has been collected within the city limits of Melbourne and statistical analyses has been conducted in Norway. Bits and pieces has been written and we hope to see a developed draft of the manuscript early next year. Based on Andreas' master thesis a paper has been written and will be submitted to Agriculture, Ecosystems & Environment before Christmas. The focus of the paper is the strange fact that bumblebees are excluded from the raspberry fields by honeybees and the contrasting temperature sensitivity of the two types of pollinators. In addition, we are working on a paper related to the issue of parallel sampling, now also including Thomas on Lesvos.

Collaboration with the industry

Since we have abandoned the raspberry fields our interaction with the industry has been limited in 2016. Dr. Nielsen is still regularly in touch with Nina Heiberg from Gartnerhallen (the fruit producers' cooperative) and in November he attended the biennial "Gartnerkongressen" where producers and industry meet to discuss relevant topics.

Master students

The "Dr. Nielsen I presume group" is constantly expanding and there are currently five master students associated with the PolliClim project.

Julie Paus-Knudsen is back from politics and about to start her experiments on bumblebee behaviour in response to neonicotinoid pesticides. The plan is to submit her thesis in June 2017.

Ingvild Fonn Asmervik is working on her thesis focusing on pollination in Soy. We are awaiting some extra data from Argentina and the writing process is about to start. The plan is to submit her thesis in fall 2017.

Solveig Haug and **Arrian Karbassioon** have done an excellent job in the field this summer and are about to start working on the statistical analyses. They plan to submit their thesis in June 2017.

Lisa Fagerli is really on the ball and has already done a full field season in the far north. She plans to submit her thesis in June 2018.

Outreach/dissemination/presentations/publications

One scientific paper is published, one master thesis has been defended, three papers are in prep. And five master thesis are under way. We are not doing too bad. An article is submitted to the popular science magazine "Biolog" for

a special issue related to a conference where Dr. Nielsen did a lecture on pollination related stuff.
The PolliClim project, including Dr. Nielsen himself and the master students, has given 18 oral presentations and two posters in 2016. This is very good indeed!

Norway is about to develop a "Strategy for wild bees and other pollinators". Dr. Nielsen has been invited in as an expert in particular regarding what is going on in other countries. For the time being the process is not going particularly well. The Department for Food and Agriculture is leading the process and in Dr. Nielsen's opinion it is not going in the right direction. A new meeting at the Department is scheduled Monday December 19th and hopefully things has improved since last time.

In May 2016 a mobile exhibition went on the road. Its name was Humlebuzz and it visited several schools in Oslo, Gjøvik, Ålesund and Trondheim. Dr. Nielsen was invited in as a pollination expert, as the purpose of the exhibition was to teach primary school children about pollination in general and bumblebees in particular (Fig. 3).

Grants and awards

In January 2016 Trond Reitan received the prestigious award "PolliClim employee of the year 2015". A very formal ceremony took place in Dr. Nielsen's office involving both a diploma and a bottle of Dr. Nielsen Bitter.

At the Annual CEES Student Conference Ingvild Fonn Asmervik received the price for best master student presentation. Although the entire group performed very well, Ingvild made us all very proud.

As the PolliClim project is coming to an end panic was developing within Dr. Nielsen's head. Several applications for funding had been rejected, but the Research Council of Norway finally realized that keeping Dr. Nielsen and his team alive is money well spent.

Figure 3: The front page of the "Humlebuzz" info folder distributed to primary school children and their teachers throughout Norway.

Through the Miljøforsk program they therefore approved, and decided to fund, the project "Effects of neonicotinoids and temperature on crop pollination". If fully financed (10mill NOK) the project will cover Dr. Nielsen's bills throughout 2020. In addition, the project will take on a Ph.D. student, increasing the workforce substantially. Key collaborators on this project are Katrine Borgå, a Professor ecotoxicology (and old friend of Dr. Nielsen) here at the University of Oslo, Dara Stanley at the University of Gallaway in Ireland and Mike Garratt at the University of Reading, UK.