

Short Term Scientific Mission in Turku (Finland) report

STSM Topic: Learning new techniques of endophytic fungi isolation, cultivation and removing from seeds

My monthly stay in Turku boils down to:

1. Introduction to the Finnish team's endophytic research infrastructure
2. Presentation of my own results and the Polish team's research subjects
3. Learning new techniques
4. Participation in classes and a conference
5. Sightseeing and learning about the local culture and history

1. Introduction to the Finnish team's endophytic research infrastructure

I spent my first days in Turku being show some of the University facilities, especially, of course, those connected with endophytes research: among others labs, preparation rooms, phytotrons etc. (**See Attachment 1**). Also, I have visited the Botanical Garden on Ruissalo island, where some of the endophytic experiments are also run. I've seen large and beautiful palm house with many exotic plant species there as well.

At the beginning of my second week in Turku, Prof. Kari Saikkonen, who works for MTT Agrifood Research Finland, showed me around the seat of MTT in Jokioinen (approximately 80 km from Turku), including greenhouses, outdoors experiments sites (**See Attachment 1**) and very well-equipped molecular laboratories.

2. Presentation of my own results and Polish team's research subjects

On Wednesday 21st of November I presented my preliminary research results to local researchers – Prof. Marjo Helander, Prof Kari Saikkonen, researchers from the University of Eastern Finland in Kuopio – dr. James Blande, dr.Tao Li and the PhD student Sandro Rhoden from University of Maringá (Brazil). The title of my presentation was as follows: *Soil factors in infection of grass Puccinellia distans with endophytic fungus Epichloë typhina: defining their role using spatial analyses*. After my speech, I have received a lot of valuable comments and we also discussed further plans connected with my work.

I also told a little about the Adam Mickiewicz University in Poznan and of course about our team managed by Prof. Marlena Lembicz. My presentation showed the research problems we currently deal with (effect of fungal infection on resource allocation, habitat factors that initiate and promote the infection, *Epichloë* – *Botanophila* association, searching for new infected grass species in Poland), our facilities and methods of work.

3. Learning new techniques

Furthermore I was thought a new method of detection endophytes in grasses. This technique is connected with placing small pieces of previously soaked in alcohol and bleach grass tillers on Petri dish with PDA medium. If a tiller is infected with endophyte the white mycelium is visible after 1-2 weeks growing out of the tiller piece's tips. I run this analysis on almost 150 samples of tall, red and meadow fescue (received from Kuopio University), so I can say that I've gained a certain initial experience in this method. I have learned how to visually recognize and distinguish endophyte *Neotyphodium* mycelium growing on agar from other species of fungi as well (see **Attachment 2 – Detection**).

In the following weeks I was thought, among other things, how the isolation of pure cultures of endophytes is carried out, which is not a complicated process, but similarly to the described above detection method, it requires sterile conditions (see **Attachment 3 – Isolation**).

I was also shown how to run flow cytometry analysis in order to determine the ploidy level of *Festuca rubra* from different European populations. I helped with plant samples preparations for this tests as well (See **Attachment 1**).

I've talked over with prof. Marjo Helander, how to best run the test of removing fungal infection from the seeds of grasses species that we use in Poland in our experiments (*Puccinellia distans* among others), because each species of grass requires to develop a separate, unique procedure to get rid of the fungus, while maintaining seed ability to germinate. I have also received detailed protocol description of the formula that Finnish researchers apply to remove endophyte from the grass species they use in experiments. I plan to work out the best routine for our grass species basing on Marjo's tips in our lab anytime soon.

4. Participation in the classes and a conference

During my stay in Finland I attended “Futuyama Evolution” classes and weekly Ecology Seminars in English thanks to which I was introduced to current research trends in ecology at the Turku University. Also, I participated in the PhD seminar, during which spoke Serdar Dirhan, the PhD student at the Turku University supervised by Kari Saikkonen. Serdar described the Finnish team’s latest experiments, which aim to determine the infection status of *Festuca rubra* populations across Europe (from Finland, Sweden, Switzerland, Spain and Faroe Islands), check the ploidy level of different populations and transplant plants from one location to others. Moreover, he presented some partial results.

On the 13th and 14th of December, the Finnish National Ecology Meeting took place in Turku. At the conference, spoke not only researchers from Turku, but also from the Universities of Helsinki and Jyväskylä, among others. Due to participation in the conference I had some insight into the subject of ecological studies in Finland and also could form my opinion on the Finnish research system. I especially enjoyed two speeches: *Ecological research in Amazonia: piecing together a picture of the tropical rainforest and how its biodiversity came about* (Hanna Tuomisto) and *Genomics in the wild: genome-wide scans reveal a genetic contribution to life history strategy in wild Atlantic salmon* (Craig Primmer), both gave by the researchers from Turku. I also found very interesting discussion about the initiative called *Peerage of science* which is basically a new paper review system worked out by the Finnish scientists, which main functions are to speed up review time, make reviews more reliable and unbiased and lower the publication costs.

5. Sightseeing and learning about the local culture and history

Furthermore, my stay in Turku was a great pretext for finding out something about Finland, Turku and meeting new people. Among others, I’ve visited the 14th century Turku Cathedral which is located very close to the University and which ascetic beauty really spoke to me. In the winter season, it is also possible to make some souvenir shopping on Christmas market which is near the Cathedral. Thanks to the hospitality of my hosts – Marjo and Kari, I had the opportunity to visit the island of Kailo, near the town Naantali, on which is situated the famous theme park, Moomin World. I was particularly happy with this trip because I am a big fan of the Moomins’ stories. I have also seen the most famous landmark of Turku which is

the Turku Castle – it is one of the oldest structures of this kind on the whole Scandinavian Peninsula (**See Attachment 1**). I got especially interested in the Castle history, when I have found out that in the 16th century, the Polish princess, Katarzyna Jagiellonka (Katariina Jagellonica), who was married to the Finnish Duke John (later king of Sweden, John III), lived there.

Thanks to the Turku University ‘international policy’ I had a great opportunity to meet a lot of PhD students and postdocs from all over the world, among others, from Brazil, Turkey, Scotland, UK, Cuba, Canada, France, Spain, Italy, Russia, China or Albania. I think that meeting new young scientists was the biggest added value of this trip.

To summarize, I consider my stay in Finland as a very productive, educative and also helpful in my own research.