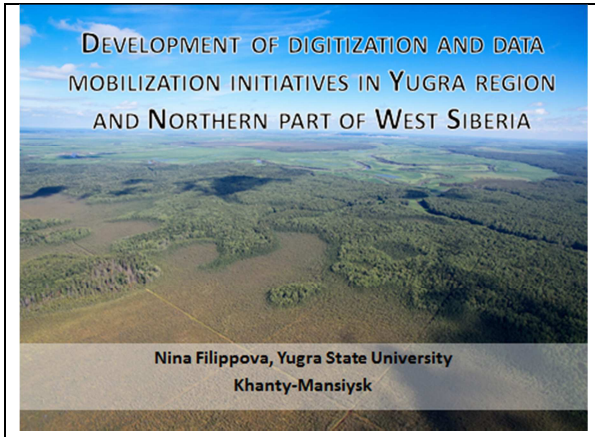
<table>
<tr>
<td> 
</td>
<td>DEVELOPMENT OF DIGITIZATION AND DATA MOBILIZATION INITIATIVES IN YUGRA REGION AND NORTHERN PART OF WEST SIBERIA
Filippova N.V., Yugra State University</td>
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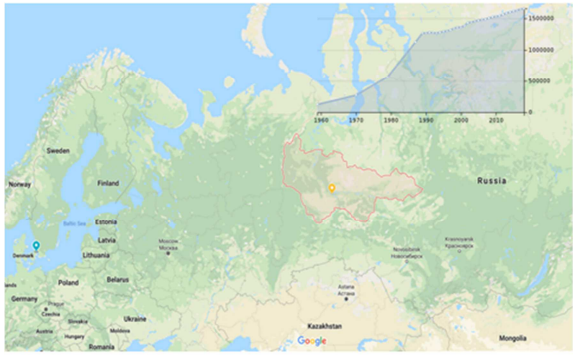
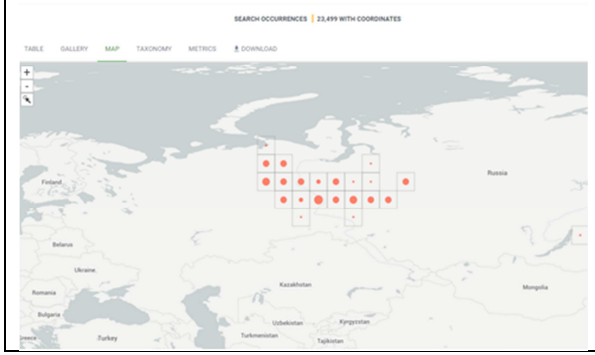
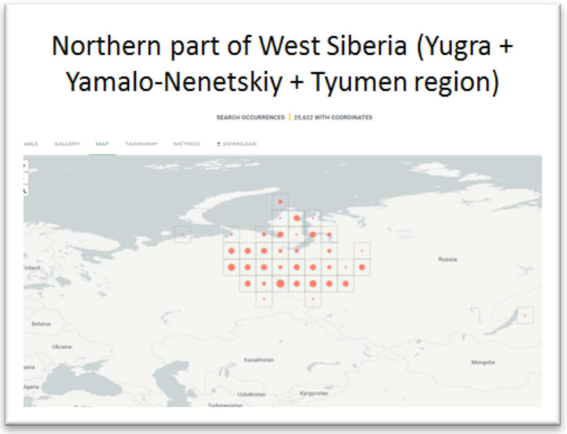
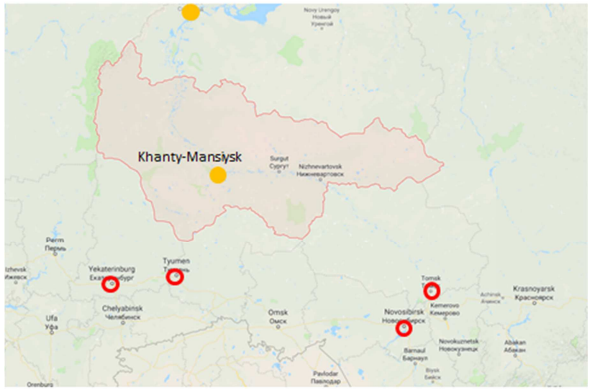
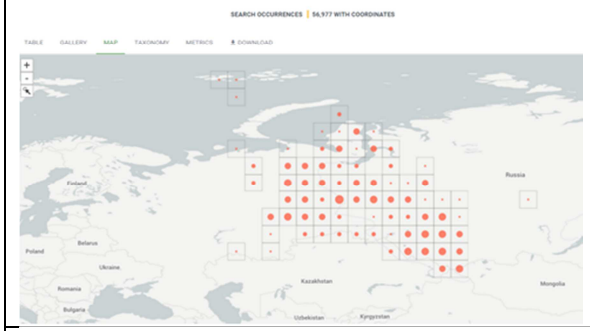
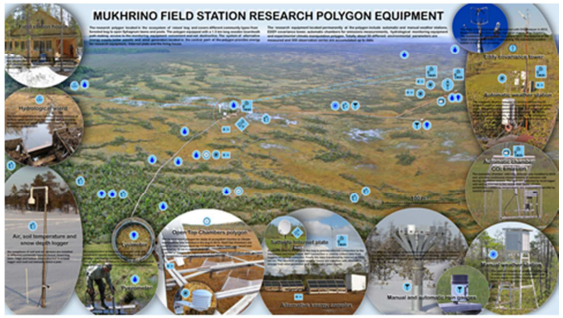
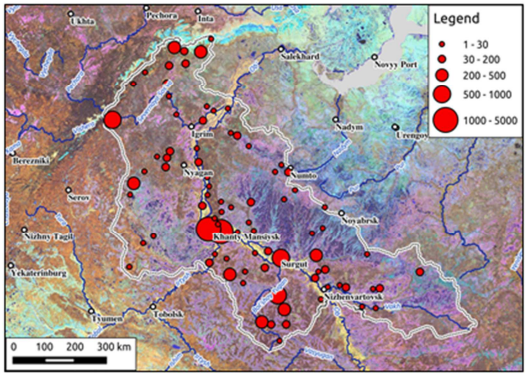
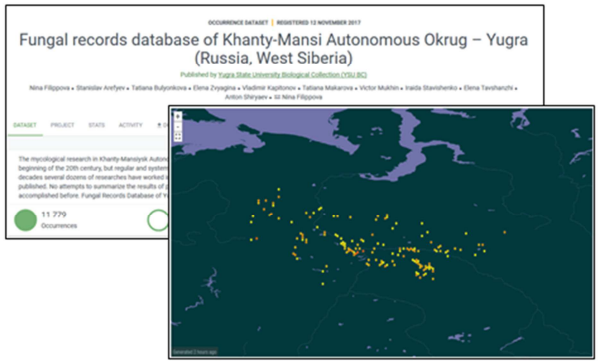
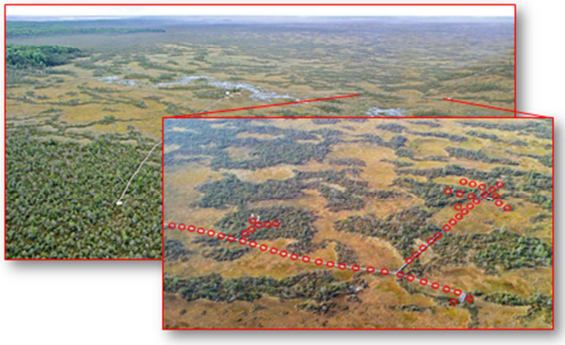
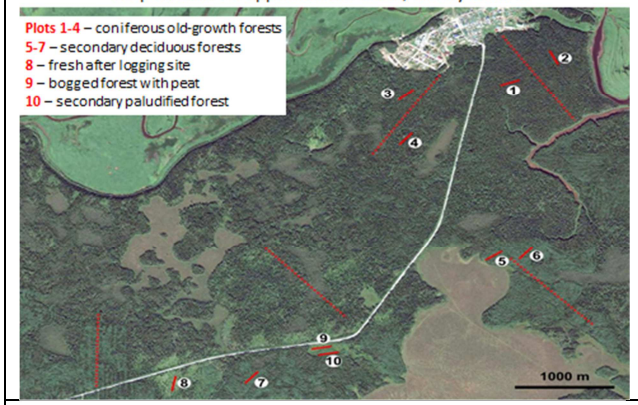
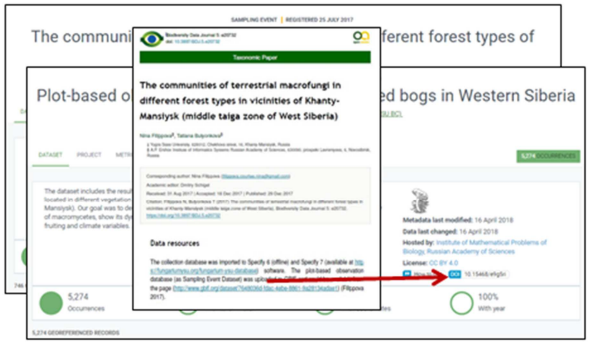
<tr>
<td>Yugra region, central part of Western Siberia,
500 000 km^2, 1.5 mln population
 
</td>
<td>Khanty-Mansi region, historically called “Yugra” is located in the central part of West Siberian plain east of the Ural Mountains. Together with Yamalo-Nenetsky and Tuymen region they form larger administrative division and all of them represent relatively recently developed areas of Siberia with leading industries of oil and gas extraction. The area of Yugra is about 500 000 km^2, which is about 12 times larger than Denmark; the population at the same time is lower in Yugra by 3.5 times. Due to oil and gas industries, the region has one of leading positions in economical development among other regions in Russia. Yet, this development has recent history, starting from oil and gas discovery in the 50-60th of XX century, which turned the region to a new era with its population starting to climb quickly.</td>
</tr>
<tr>
<td>Yugra region represented in GBIF
 
</td>
<td>Here is a slide showing how the area of Yugra region looks from GBIF perspective: about 23 thousand observations in Yugra regions, and about 26 thousand in the Northern part of Western Siberia altogether.</td>
</tr>
</table>

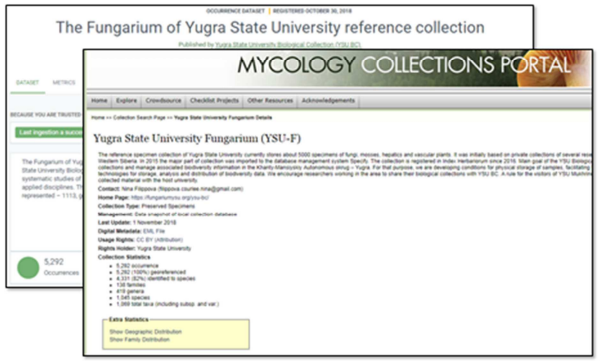
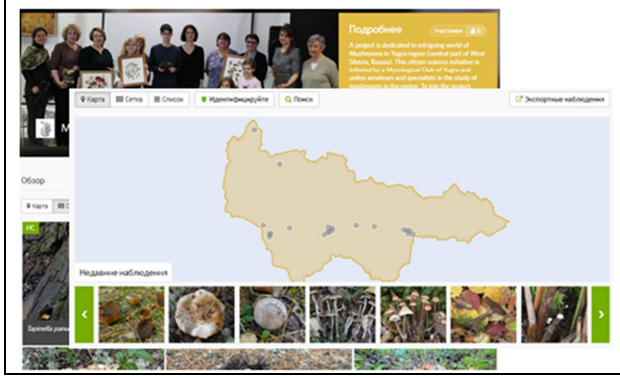
	
Nature protected areas in Yugra: 25 in total 	The development of scientific institutions has started recently as well, about 5 universities in the region being opened in the 90th. Yugra state university was opened in 2003, and it still does not have a classical Biology department (Nature management department instead). The history of Nature Conservation was started by the way earlier, with the oldest Kondo-Sosvinksiy nature reserve opened in 1929 (I will show some photographs of it at the end of the presentation). Presently the region poses 25 nature conservation areas of different protection regimes, two of which strictly protected areas. These nature protected reserves employ about 50 researchers in total.
Main scientific centers in Western Siberia 	Due to lack of its own scientific centers in the past, the region was historically investigated by institutions from adjacent southern regions, from Tyumen and Yekaterinburg towns especially. Several institutes in these towns are dedicated to research and development of the North. The collections and other biological materials were therefore exported and stored in the place of work of the researchers. The situation is the same in the region adjacent to the north – Yamalo-Nenetskiy okrug does not have its own universities, or institutions but they have a scientific department within the administration which initiates research grants and actively invites researchers to work on temporal basis. Compared to this developing in terms of biodiversity science regions, there are in West Siberia other scientific centers which have much longer history. Thus, the oldest university in Siberia was opened in 1888 in Tomsk which stores now one of the largest herbarium collections named after Porfiriy Krylov, one of the first botanists working in the area. The Novosibirsk has its own scientific center organized in 50-60th including about 20 research institutes and several well-known biological once. The Central Siberian Botanical garden and the Siberian ecological center are two organizations registered and providing data in GBIF, among them.

Western Siberia represented in GBIF (11 regions altogether), 7 organizations registered  	And this slide shows the GBIF perspective on Western Siberia (11 regions altogether, totally about 57 thousand observations). Compared to Russia perspective, we have now 51 organization registered and about 62 datasets published in Russia altogether.
Opening ceremony of the XIth Mycoschool in Tomsk, August 2018, TSU library 	Here I want to show two short videos which I made attending two conferences this summer, partly with GBUF-ambassador presentations, in Tomsk and in Novosibirsk.
The museum of history of botanical research in West Siberia, CSBG, Novosibirsk  	

Mukhrino Field Station of Yugra State University https://mukhrinostation.com  	Tomsk state university was my Alma Mater, and as a student I practiced in field expeditions of Central Siberian botanical garden. My supervisor and boss Elena Lapshina as well went from Tomsk state university to start a department of her own in a recently opened back then university in Yugra. One of her idea-fix was a field station of modern type to conduct permanent monitoring of northern peatland ecosystems. The station was opened in 2008, called “Mukhrino field station” after a lake of the same name in vicinity. It has quite modern equipment for studies in ecology and carbon cycle, although lack of sufficient number of researcher. Among other important things, the station is part of several international networks, one prominent being INTERACT (a network of Arctic stations) which provides management support to its members as well as access to the stations for many researchers interested in remote areas to visit. Collections made during the history of Mukhrino field station, as well as several other field projects in Yugra, have formed the basis of the Biological collection of specimens of Yugra state university.
Yugra State University Biological Collection https://fungariumysu.org/ysu-bc  	In the frame of this project, I was instructed to test some developed open-source software for biological collections data management for their further use in Yugra. We started to use Specify software for management of our YSU Biological Collection data, as for training. The system now has online version Specify 7, an Attachment server, and a portal (simple web version for browsing the collection). The installation was made on a server of Yugra State University. We also plan to expand the possible users of the system by inviting other collections to store and manage their data within this installation. Now from the pre-history of digitization and data mobilization in Yugra we will move to the subject of Fungaria and GBIF, which was initially declared. The reason for this is that my interest of research is mycology: diversity and community structure of communities of macrofungi in peatlands and taiga forests. The accumulated specimens of the research initiated in 2012 from my PhD work made a physical collection of fungi in Yugra university which was not there before, and started linked related to this curatorial activities in data management. Next I will describe several projects which were done in relation to research in Fungarium YSU and data mobilization activity.
A cloud of words built from the titles of mycological publications in Yugra  	This cloud of words shows the most often used terms in the Titles of mycological publications in Yugra region, totally about 150 works published since the beginning of the 20th century.

Maps of records in FReDY 	About 2/3 of them contained any type of fungal records, which were extracted and integrated in a database called Fungal Records Database of Yugra. The FReDY database was made based on DwC and includes about 13 000 records of fungi made within the Yugra region (which are shown here on the map).
Bibliography of mycological publications in Yugra https://fungariumysu.org/fredy A brief history of Mycological research in Yugra • BIBLIOGRAPHY of Mycological publications in Yugra (pdf) • COLLECTION of Mycological publications in Yugra (Endnote XML, archive) • Filippova N.V., Arefyev S.P., Bulyonkova T.M., Zvyagina E.A., Kapitonov V.I., Makarova T.A., Mukhin V.A., Stavishenko I.V., Tavshanzhi E.I., Shiryaev A.G. 2017. The history of mycological studies in Khanty-Mansi autonomous okrug: 1) the period of isolated studies, lignicolous basidiomycetes and phytopathological studies // Environmental dynamics and global climate change. V. 8. No. 2. P. 18-28. (http://journals.eco-vector.com/EDGCC/article/view/7132) [in Russian with English abstract] • Filippova N.V., Arefyev S.P., Bulyonkova T.M., Zvyagina E.A., Kapitonov V.I., Makarova T.A., Mukhin V.A., Stavishenko I.V., Tavshanzhi E.I., Shiryaev A.G. 2017. The history of mycological studies in Khanty-Mansi autonomous okrug: 2) study of Macromycetes, Lichens and Myxomycetes, state of mycological collections and fungal records database // Environmental dynamics and global climate change. V. 8. No. 2. P. 29-45. (http://journals.eco-vector.com/EDGCC/article/view/7134) [in Russian with English abstract]	Together with the data basing, we analyzed the publications and summarized the history and the results of mycological research in Yugra in two papers.
Publishing FReDY as GBIF dataset 	This preceding work was useful to then publish an Occurrence dataset in GBIF, co-authored by all mycologists who were working in the area and supplied their data in publications and then into the database.

Plot-based observations of communities of macrofungi in **raised bogs** Total area of sampling = 1385 м², 277 micro-plots 5 м² 	Another realm of fungal records data comes from plot-based monitoring of macrofungi, which is conducted in Khanty-Mansiysk. About 500 permanent circular plots were installed in 2014 in different peatland and forest types there, for observations for many years.
… and in different forest types: 10 plots and 10 opportunistic routs, totally 1000 m² 	
Data on community quantitative structure and dynamics 	This would allow to estimate community structure of macrofungi in a quantitative way as well as to provide its seasonal and long-term dynamics. This type of data well suited for Sampling event dataset type, although there was no any datasets following the similar protocol of counting the communities of macrofungi in GBIF before (therefore the comparisons are impossible so far). The resulting dataset of observations over 4 years in bog communities includes about 15 000 plot-based observations (=sampling events). And another dataset of observations over 1 season in different forest types included about 1200 plot-based observations, but it should be updated soon by following years of monitoring. One paper was published in relation to this monitoring in Biodiversity Data Journal, which was preceded by this dataset publication, and then cited it in the publication as a source of raw data.

Fungarium YSU, http://specify.ugrasu.ru 	The next example is about the abovementioned Fungarium collection of Yugra state university now comprises about 5500 specimens of fungi. The database is managed in Specify software and is available for online search and management. But to make it visible for broader community, it was uploaded as Occurrence dataset in GBIF.
Fungarium database in GBIF and Mycoportal 	The procedure of export from Specify and import to IPT is quite straightforward, and could be made automatically in the future (regular update from server-installed database). After upload to GBIF, this dataset was discovered by colleagues from Mycoportal, and another copy of our database was then uploaded to Mycoportal. Also, this could be done with PlutoF as I have recently become familiar with this platform. Having several copies of our Fungarium collection database and of course having it in GBIF helps to raise the demand of the collection. Directly after publishing the dataset in GBIF there were several contacts who asked for specimens for further studies.
iNaturalist: citizen science observations **https://fungariumysu.org/inaturalist** 	The last project which we will see under the umbrella of Fungarium's digitization initiatives relates to citizen science. The community of amateur mycologists in Yugra region only starts to develop, but there was a nice tradition of organization of fungal festivals and autumn mushroom exhibitions in Khanty-Mansiysk since 2010. A year ago we initiated a Mushroom club of Yugra which become a platform for regular meetings and practical mycology-related seminars during the last year. It is well understood that the community of amateur mycologists could provide broad range of observations and to fulfill fungal records databases of the region. As a basis of such database we chose iNaturalist platform and initiated a project for Mushroom club of Yugra there. By the end of last vegetation season we yielded about 400 observation in the project, but more valuable is several amateur mycologists in Yugra have learned to use iNat and learned to identify mushrooms over the process.

Biodiversity portal of Northern part of Western Siberia

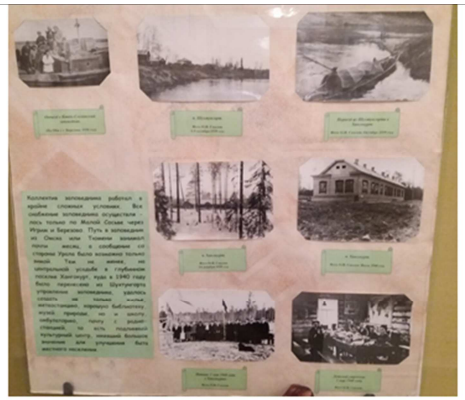
Having shown these examples of different types of data digitization with Fungarium YSU examples, I will come back to regional perspective and conclude a little bit with our plans for the future and dreams.
The dream is when you have a last piece of your region biodiversity data digitized and put into one integrated database with its portal based probably on ALA tools. Then you could just go into the forest and live there with your laptop and microscope and nothing would disturb you anymore, except for the bears who will probably come to say Well done!

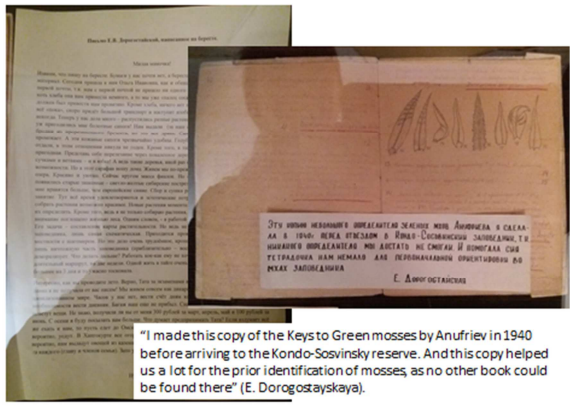
This would need some time of course, as now only a few researchers in the area are aware of GBIF programs and other data mobilization initiatives. There are some important steps and this year we are going to make the digitization programs more integrated and intense. During the GBIF-ambassador program I have attended two regional conferences with presentations about data publishing and mobilization. There was some interest among the audience, e.g. nature reserves governments asked if some practical workshops could be organized for reserves employees to show these topics in detail. As such, we started to register these organizations and share detailed instructions on data publishing with them. The next step was to make a prototype of a biodiversity portal of the Northern part of West Siberia (https://nwsbio.wordpress.com/), which would include different possible sources of biodiversity data and needed instructions and useful links about digitization programs. This web resource will help to organize data and to inform the community about the ongoing activity. Of course, the core part of the portal – the database and its visualization is absent here and needs some programmers work in the future. Before that, the different possible sources of data will be digitized, accumulated in local databases and uploaded to GBIF. The financial support for this project is sought from several grant providers.

The first building of the nature reserve, which was also a living house, in Shuhtungort settlement, 1929

I want to conclude with several photographs from photo-archives of the oldest nature protected area in Yugra, Kondo-Sosvinskiy Nature Reserve which was opened in 1929 in north-western part of the region. The reserve was initiated to restore the populations of hunted animals: Siberian subspecies of beaver, and sable; it covered about 8 000 km^2. I have visited the nature reserve recently and attended a nice museum of its history. These photographs worth of course looking at and looking into the past of our predecessors lives and achievements:

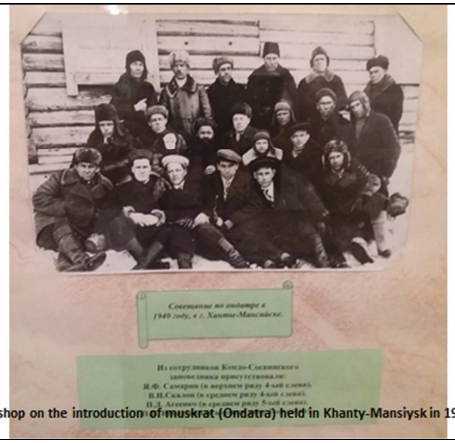
1. The first building of the nature reserve, which was also a living house, in Shuhtungort settlement, 1929

 A map manually drawn on graph paper by the first director of the Nature Reserve, Vasilyev V.V., 1931	1. A map manually drawn on graph paper by the first director of the nature reserve, Vasilyev V.V., 1931
 This exposition of the Reserve's museum shows several photographs of the earlier times of the reserve.	1. This exposition of the Reserve's museum shows several photographs of the earlier times of the reserve. It says that the reserve team worked in extremely difficult conditions. All the reserve supply was carried out only by Malaya Sosva river through Igrim and Berezovo. The journey to the reserve from Omsk or Tyumen took almost a month, and communication from the Urals was possible only in winter. Nevertheless, on the central estate in the deep village of Khangokurt, it was possible to create not only housing, a weather station, a good library, a museum of nature, but also a school, ambulatory, mail with a radio station, thus to create a genuine cultural center that was of great importance for improving the life of the local population.
 The first researchers botanists working in the reserve, Garnovskiy Kronid and Dorogostayskaya Eugenia (worked in 1939-1946, all the years through WW II).	1. This poster shows biographies of two first researchers botanists working in the reserve, Garnovskiy Kronid and Dorogostayskaya Eugenia (worked 1939-1946, all the years through World War Two in the reserve).



"I made this copy of the Keys to Green mosses by Anufriev in 1940 before arriving to the Kondo-Sosvinsky reserve. And this copy helped us a lot for the prior identification of mosses, as no other book could be found there" (E. Dorogostayskaya).

1. And this piece of text is what I wanted to stop at. It was written by Dorogostayskaya Eugenia on a piece of birch bark a week before WWT would break in Russia, to her mother. And i will cite and translate a few sentences from this text, so that they won't always be connected.
    a. "Sorry for writing on birch bark. We have almost no paper, and bark goes for everything. This is a very convenient material ... In addition to bread, there is nothing neither here nor in Hangokurt. But this is all for now, big transport will soon come by river and abundance will come. We catch fish a little, but there is no time. Now we have a lot of work to be done - different plants have started to blossom. We walk and walk through the forest ... What was really useful for me is your waders! The blue dress you gave me is not good in this regard. Imagine climbing over a fallen tree, with knots and branches sticking out in all directions - and in a skirt! … We still live in our hut on the shore of the lake. Beautiful and cozy … Collecting and drying plants is an extremely pleasant activity. Aesthetic needs are being fulfilled for all the time as well. All the time I am trying to collect plants perhaps more beautiful."



A workshop on the introduction of muskrat (Ondatra) held in Khanty-Mansiysk in 1940

The botanical collections made by Dorogostayskaya and Gornovskiy are still stored in the herbarium of Malaya Sosva nature reserve, and awaiting of its digitization. And I think that like this author managed to pass the message to next generation using this piece of birch bark, the same we must pass the message using Darwin Core and other contemporary means of communication.

Thank you for your attention!