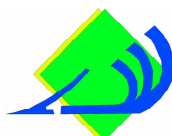
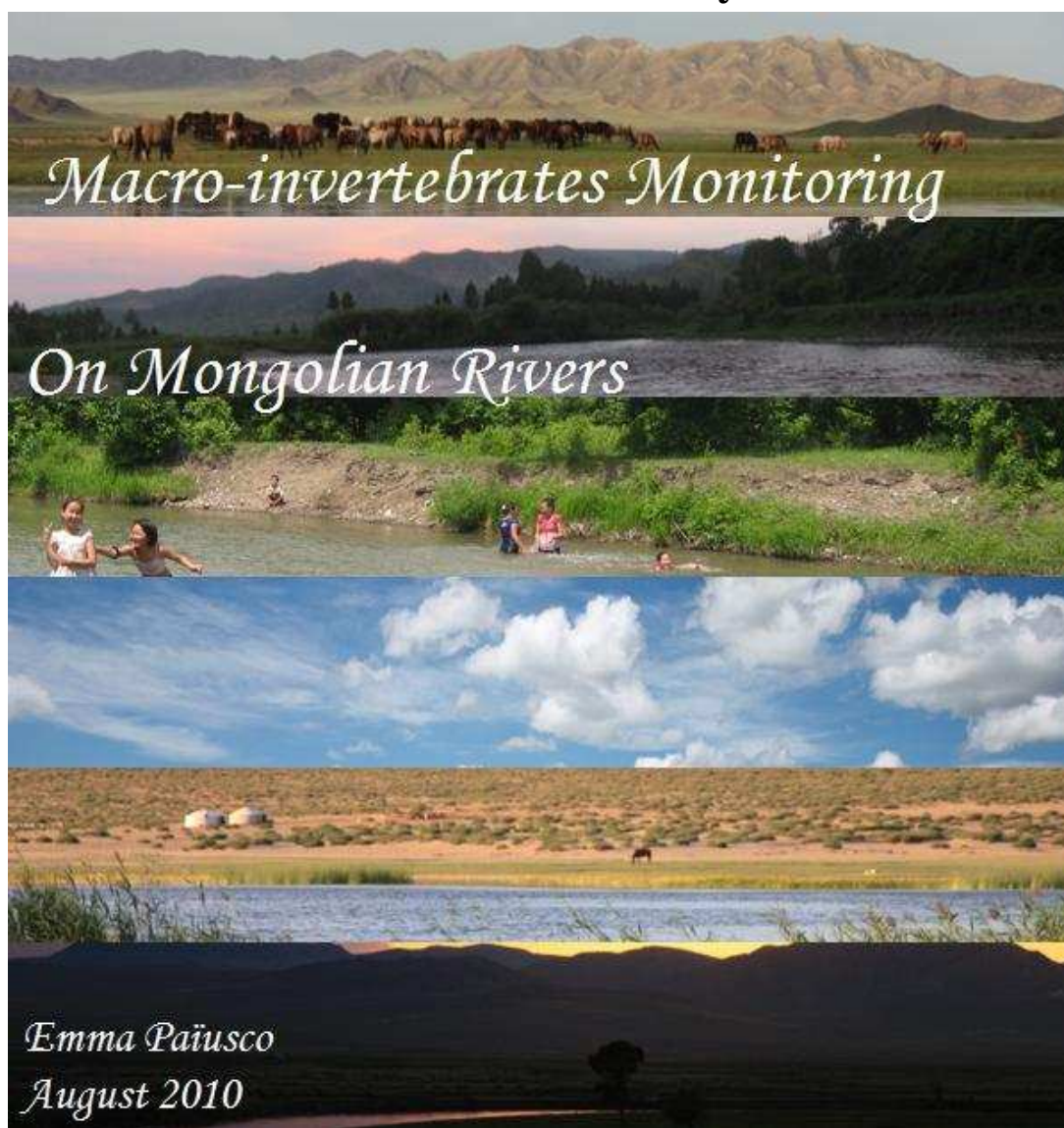


Compulsory training period Report to complete the Master's first year



МОНГОЛЫН ГОЛ НУУРУУДЫН НЭГДСЭН ХӨДӨЛГӨӨН
(The United Movement of Mongolian Rivers and Lakes)

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Table of contents

<i>Summary (English)</i>	4
<i>Résumé (Français)</i>	4
I. Introduction	5
II. Presentation of Mongolia, The United Movement of Mongolian Rivers and Lakes NGO, and of my mission	6
<i>Rapid introduction to Mongolia</i>	6
<i>Nowadays situation of Environmental Protection in Mongolia</i>	7
<i>The United Movement of Mongolian Rivers and Lakes NGO</i>	7
<i>My missions in the UMMRL</i>	9
III. Material and methods	9
<i>Equipment used to the research</i>	10
<i>Methods</i>	10
Hydrobiological research	10
Student instruction to hydrobiological research.....	11
IV. Results	11
<i>On the Bugant river</i>	11
<i>On the Tuul river</i>	12
V. The Russian/Mongol kids exchange week	15
VI. Conclusion	17
VII. Bibliography	18
VIII. Figures and tables list	19
Annexes	20



Summary (English)

This document treats about the compulsory training period I have to do during the first year of IHBV (IMACOF) Master formation.

My summer internship has been done in an Mongolian environmental Non Governmental Organisation (NGO) – The United Movement of Mongolian Rivers and Lakes or River Movements – which is a federation of several regional movements, and theirs main goal is to protect the Mongolian water ressource, which is often impacted by anthropic activities, particulaly by mining.

Because the NGO is recent and lacks of means (financial and technical) to define water quality, the student has done an hydrobiological study on Mongolian rivers. This study will enable a first approach with invertebrates for the NGO members, but will also bring hydrobiological data about some Mongolian rivers, and it will enable the student to do a study that she learned basis at university.

Key words:

Non Governmental Organisation – Mongolia – Water ressource – Invertebrates – Water pollution

Résumé (Français)

Le présent rapport traite des différentes activités que j'ai réalisées lors du stage à caractère obligatoire dans le cadre de la première année de formation du master IHBV option IMACOF.

Ce stage a été réalisé dans une Organisation Non Gouvernementale (ONG) Environnementale Mongole – The United Movement of Mongolian Rivers and Lakes ou River Movements – qui est la fédération centrale de plusieurs mouvements régionaux, et qui a pour mission générale de protéger la ressource en eau Mongole, souvent impactée par des activités anthropiques, notamment minières.

L'ONG étant récente et disposant de peu de moyens (financiers et techniques) pour déterminer la qualité des eaux, j'ai mené une étude hydrobiologique sur différentes rivières Mongoles. Cette étude permettra de fournir les outils pour une première approche avec les macro invertébrés benthiques aux membres de l'association, mais fournira également des données hydrobiologiques sur les rivières étudiées. Elle permettra aussi à l'étudiante membre de l'ONG, qui m'a accompagné, de disposer d'une expérience pratique pour continuer à mener ce type d'étude, dont elle a appris les bases à l'université.

Mots clés :

Organisation Non Gouvernementale – Mongolie – Ressource en eau – Invertébrés – Pollution de l'eau



I. Introduction

Mongolia is a country well-known for its huge landscapes, infinite blue sky and the nomadic way-of-life of its inhabitants. But it is also a country with a lot of natural resources as gold, copper or uranium for example, which aren't exploited. Since 1990 and the end of the Sovietic Union, Mongolia had quickly and massively liberalised itself. The lack of drastic law to preserve natural environment, and funds to apply them, had inevitable consequences as the pollution of water resources.

Because of the rich soil resources of Mongolia's underground, many legal mining companies came from everywhere in the world to exploit them, without taking care of the environment. Around those companies, artisanal gold miners, called "ninjas¹" in Mongolia, are working, most of the time in dangerous and unhealthy conditions.

During the 2009 summer, I took part of a project made by the French association L'Eau-Tarit² called "Towards an uncontaminated environment free from heavy metals in Mongolia". We went through Mongolia, sampling water from rivers and groundwater, in order to analyse heavy metals concentration in it. To give our study a positive impact on local population, we worked in collaboration with national organisations, as the Mongolian Water Authority, or the United Movement of Mongolian Rivers and Lakes.

The experience makes me realize that some Mongolian rivers are contaminated by heavy metals, and that local organisations haven't got qualifications and funds to improve their environment quality and to preserve their country richness.

Because of my background, my passion for this country and my knowledges in rivers and water quality, I choose to do my summer internship in a Mongolian Environmental Non Governmental Organisation, the United Movement of Mongolian Rivers and Lakes³ (UMMRL).

During this internship I monitored an hydrobiological study of some rivers. Hydrobiological study is an interesting way to estimate the water degradation. The rivers macro invertebrates are a good indicator of water quality because they differ in their sensitivity to water degradation. Plus, one doesn't need expensive equipment to make that kind of research.

The first part of the report gives a rapid presentation of Mongolia, the national actual situation of environment preservation, my training period structure and the missions they gave to me. Then it explains how I managed my study, giving material and method details. In a last part, we can find the result datas and notes about them. Finally, this report ends on a conclusion.

¹ The term comes from the circular green pans many of the gold miners hang on their backs while walking to and from the gold fields. From the air, the pan makes them appear to resemble the "ninja turtles" of cartoon fame.

² Address of the association website: www.leautarit.com

³ Address of the NGO website: www.rivermovements.org



II. Presentation of Mongolia, The United Movement of Mongolian Rivers and Lakes NGO, and of my mission

Rapid introduction to Mongolia

Surrounded by Russia and China, Mongolia is a country well-known for its huge greeny landscapes, but you can also find very diverse sceneries in that nation. At the west, it is a mountainous area, with the Altai mountain range, and its higher peak is the Khüiten peak at 4 374m. To the south of Mongolia, there is a barren land, the Gobi desert, whereas the north is an area covered with forest and greeny steppes. The central and eastern Mongolia is an area of huge steppes. The average altitude of the country is 1580 m.

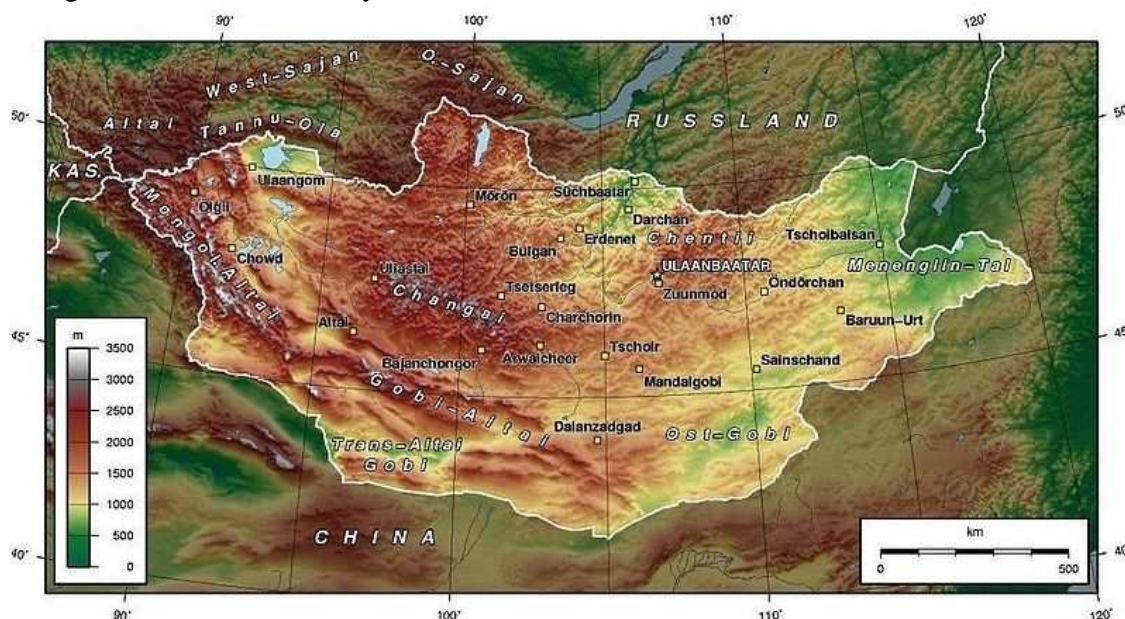


Figure 1: topographical map of Mongolia. [<http://fr.academic.ru/dic.nsf/frwiki/1181153>]

With merely 2 736 800 inhabitants for 1 564 116 km² (as approximately 3 times France land), Mongolia has the lowest density country of the world. More than 50% of the population is sedentary, and almost 75% of them lives in the capital, Ulaanbaatar. The other half of the population is nomad, and lives on its livestock, in traditional tent made of felt called “gers”.

There are many lakes, of fresh and salty water, the most famous one being so the Khövsgöl lake, because it holds almost 70% of Mongolian fresh water. There is also many rivers, as the Tuul which runs through Ulaanbaatar city, or the Orkhon river and its beautiful valley, and also the Selenge river which flows into the Baïkal lake (in Russia).

Mongolia have an extreme-continental climate, very hot and dry weather during the summer, and bitterly cold in winter. Temperature can vary between 35°C in july and -40°C in january in the same city.

From about thirty years ago, Mongolia is knowing some climatic problems. There is less and less rainfall, which are more severe storms than continue rainfall, and causes big damages. Winter are



becoming harder and harder, and water resources becomes scarce.

A recent study from the Mongol environment ministry says that in five years, around 1450 rivers and lakes, and 1500 wells have dried up. More, since the year 1940 we can observe rainfall have decreased in 10%.

The 2009 winter was particularly severe, it was what Mongol people call “Dzud”. It is a very dry summer, followed by a cold winter (less than -40°C) that last for some weeks. Because of snow fall, livestock can’t graze itself, and this winter approximately 8 millions of cows, yaks, horses, goats, sheep and camels had died because of starvation, exhaustion and freeze to death.

Nowadays situation of Environmental Protection in Mongolia

As I explained in the introduction, Mongolia is a developing country, missing good environmental protection laws. Nowadays, there is a governmental water agency, which controls rivers and groundwater qualities, but people (almost people from UMMRL) doesn’t trust data given by the Mongolian national laboratory.

Because of its developing situation, Mongolia’s economy is mostly based on mining resources. So it’s difficult for governmental people to support Environmental preservation, when the biggest part of Mongolian’s incomes comes from a polluting sector.

So the actual situation for the governmental environment protection in Mongolia is not very good. But there are many NGO, national and international, which are working to improve this situation.

As example, the Asia Foundation, have an huge project for improving Mongolian’s river water quality. Each year, international expert and local people are working together to do some physical, chemical and biological analysis. You can find their data on the internet⁴. But those analysis aren’t very interesting, because they just analyse some chemical parameters (Alkalinity, Cl, NH₄, ...). Plus, they just identify the invertebrates order, and calculate a biotic index which is not really realistic of river’s biological quality. Thanks to this, they say if the water is drinkable or not, which is not really a scientist work, because it’s not complete. According to us, those methods seems to be old-school, but maybe it’s a good way to increase Mongol people awareness to water pollution issues.

The United Movement of Mongolian Rivers and Lakes NGO

Since 1990 and the end of the Sovietic Union, Mongolia has grown up really quickly. Because of the increasing numbers of mining exploitations and the lack of drastic law to preserve the environment, few problems appears in Mongolia’s countryside. Some people begun to be intoxicated and had to run off from problems linked to water pollution.

In order to protect their rivers, some local people started to do protestation actions against mining companies and against the laxist government. Those people had created preservation of the environment and of the water resources Movements, in some aimags⁵ of Mongolia.

⁴ http://www.mongolianriverresources.mn/index.php?option=com_frontpage&Itemid=1

⁵ an Aimag is a Mongolian Province



The United Movement of Mongolian Rivers and Lakes is a federation of six⁶ of those movements. Every movement have its independance, and make actions in its province.

The central NGO, based in Ulaanbaatar, coordinates all the movements actions and plans national actions, in order to improve environment laws. Its mission is to protect and/or to rehabilitate watersheds of rivers and to provide environmental and legal education to local people.



Figure 2: Mongolia aimags map and logo of local river movements[rivermovements.org]

In the United Movement of Mongolian Rivers and Lakes people from various social backgrounds are involved in the NGO activities. Some members are farmers or raisers, but there is also a lawyer counsel, and many students, in differents courses.

8



Figure 3: Munkhbayar Ts. receiving the environmental goldman prize - 2007

The association beggins to be well-known in Mongolia, but also in the world, because members do a lot of conferences, interviews for local news-papers, and often appear in televised 'talk-show'. One of them, Munkhbayar Ts., is quite famous in Mongolia, because he won the environmental golman prize⁷ in 2007, for all his actions with the Ongii river Movement.

Every year, the head of the United Movement of Mongolian Rivers & Lakes changes. It is one of the head of a regional movement that can become the new executive director of the central NGO. Last year the executive director of the UMMRL was M. Munkhbayar and since the end of 2009, M. Ganbold have this responsibility.

Merely, him and Chimgee, the foreign relations officer (and my internship tutor), are full-time paid for their work in the NGO.

As example of UMMRL actions, in june 2009, representatives of the UMMRL had demonstrated on Sukhbaatar square, the main place of Ulaanbaatar, and six of them had an hunger strike, to have a

⁶ At the beggining of my internship, there was seven movements in the UMMRL, but because one of those movement's head didn't do his job well, he was fired of the UMMRL.

⁷ The website page of the Environmental goldman prize for Munkhbayar Ts. and his Ongii river Movement:
<http://www.goldmanprize.org/node/606>



law against mining in protected zones⁸ passed by the Parliament. “The law covers an area of about 30 percent of the territory of Mongolia. Its enactment is therefore a very important step towards ensuring the ecological balance of Mongolia and a healthy and safe environment for its inhabitants, as well as towards preserving its territorial integrity and its fauna genetics.” (from the River movements website).

My missions in the UMMRL

During this summer internship, I was supposed to do an hydrobiological research on the Olziit river, in the province of Bayankhongor, well-known for being polluted by gold mining. But because of the discharge of the head of that local movement, while I was ready to go there, I couldn't do this study. So I had to quickly fitted myself to a new internship subject. The UMMRL decided to send me to the north of Mongolia, in a little soum⁹ to study a small river, the Bugant, and to introduce macro-invertebrates research to local people.

Then, I have done some sampling on the Tuul river, which is one of the main Mongol river because it runs through Mongolia's capital: Ulaanbaatar.

The aim of my internship wasn't only to study the biological quality of water, but also to introduce local people to that kind of research and to increase their awareness of water pollution.

This study also enables me to introduce to the UMMRL how to realise an hydrobiological research, and give them the keys to study biological river's quality, training a student to do that job.

I also took part of an exchange week, between Russian and Mongol kids. I explained and showed them how I worked, and increased their awareness of Mongolia water qualities issues.



Figure 4: Different pictures of local people getting interested of my work. Selenge and Bayankhongor aimags - 2009

III. Material and methods

⁸ <http://rivermovements.org/pdf/JulyLaw.pdf>

⁹ Aimags are split in “soums”, which can correspond to our French villages.



In this part of the report, I explain how I managed to do hydrobiological sampling, what kind of material I used, the method applied to analyse biological quality of water and also how I instructed the student during my internship.

Equipment used to the research

The University of Tours lend me a 'surber' net to sample according to the French IBGN standard. The UMMRL NGO doesn't have any equipment to do an hydrobiological research, so the medical University of Ulaanbaatar gives us formalin and lend us a stereomicroscope to identify invertebrates.

To have more workable datas, l'Eau-tarit association, in partnership with the Departemental Water Laboratory of Toulouse, lend me a measure device to analyse water pH, conductivity, temperature and the oxygen dissolved in water.

To identify invertebrates, we used the Henri Tachet¹⁰ book. Lastly, all the small material as flasks, basin (to sort invertebrates on site), marker pen... were bought in Mongolia.

The main problem I had, was the lack of means of conveyance to go on sampling sites. I had to fit to this situation and managed on my own to find a driver and a car, which wasn't easy to me because of my poor mongolian language knowledges.

Methods

Hydrobiological research

I decided to do a macro invertebrates research predicated on the French IBGN¹¹ standard. This method enables to sample on 8 different river habitats, if possible varying the current velocity. I have made a form in english, explaining the IBGN sampling conditions (annexes I). At this time, this form is being translated in mongol language to continue instructing local people.

After we had chosen a place representative of the river to sample, we quickly draw the station, and fill the sampling form (annexes II). Then we decide where we have to do the 8 different sampling, and we can start to sample from the bottom of the station, up to the current.

Because of the lack of formalin, we sorted invertebrates of each sample on site, and put them in little flasks with formalin.

Once we were back to the office, we indentified invertebrates thanks to a stereomicroscope and the Henri Tachet book. We indentified to the IBGN 'taxon' standart, as family or order (annexes III). Then we entered all the datas on computer. Those datas enables us to find a IBGN's standard note, which doesn't mean a lot in Mongolia, but its can makes us aware of a water quality discrease.

¹⁰ See bibliography parts

¹¹ See bibliography parts, IBGN standard NF – T90 - 350



Student instruction to hydrobiological research

Munkhstesteg is an 18 years old woman. She is studying ecology at the Ulaanbaatar's university, and she is a little bit english speaking. She takes part of UMMRL actions as a volunteer, and she is aware of water pollution problems in Mongolia.

She decided to follow me during my summer internship to get knowlegdes about macro-invertebrates research, and she wants to continue to do that kind of studies in others Mongol rivers once I left.

The UMMRL and I, thought it will be very interesting that Munkhstesteg and I make the invertebrates research together. So I explained her where, why and how to sample, showed her and let her practise. She now can fill a sampling form, and sample on her own. We sort invertebrates together, on site, and she has done a good job, because she didn't forget anything.

I explained her how to identify with the Henri Tachet's book, let her practise, but the stereo-microscope wasn't a good one, so it has been difficult work for her.

Finally, I also instructed her how to understand the datas, and give her the keys to interpret our results.



Figure 5: Munkhtsetseg, Bugant soum - 2010

IV. Results

On the Bugant river

During june, Munkhstesteg and I went to the Bugant soum in the Selenge aimag. We wanted to study macro-invertebrates on the Bugant river, which flows from Khenti Mountains. But we didn't have means of conveyance to go sampling all along the river. So we just sampled next to the soum. We have chosen a place with different habitats, representative of the river.



Figure 6: Munkhstesteg sampling on the Bugant river.

We drew a scheme of the station, and fill the sampling form (see annexe IV). Munkhstesteg made her first sample after watching me. She made it great.



We sorted macro-invertebrates on-site, and put them in little flasks with formlin.

The following table gives us all the results of that study:

Table 1: Bugant river's macro-invertebrates results

	Bugant river
Sampling date	24/06/2010
pH	8,27
O2 (mg/L)	7,4
Conductivity (µS/cm)	92
Temperature (°C)	13,5
Indicator taxon	Chloroperlidae
Variety	23
IBGN mark (/20)	15

The faunistic list of that sample is reported in annexes V. Compared to the IBGN standard, the indicator taxon is Chloroperlidae, it corresponds to a very good water quality. But the variety of taxon is not that high, so it might mean that river's habitats are not very varied.

We observed a lot of Simuliidae Diptera, and many Plecoptera as Nemouridae, which are specific to lotic ecosystems.

This river seems to be a mountainous one, so it is normal that there are not a lot of different habitats. We can say the water quality of that river is good, according to the French IBGN standard.

On the Tuul river

From recent statistics, there are about 1 300 000 inhabitants in the Mongolian capital city. There are also many companies and industries, which are generating a lot of pollution. The sewage treatment plant of Ulaanbaatar is getting too small because of the increase of rural depopulation. So downstream of the city, some organic water pollution issues appear. In summer, you can observe algal bloom in the Tuul river, few kilometers after Ulaanbaatar.

On the following frame, we can see Ulaanbaatar city, the Tuul river coloured in blue, the macro-invertebrates sampling points showed by red arrows and some of physico-chemical analysis stations I made last year.





Figure 7: Ulaanbaatar satellite picture, sampling points [Google earth]

Datas of 2009 physico-chemical analysis are reported on the following table. It sorts from where the Tuul river rises at, in Khentii mountains, to a sample station 150 kilometers after Ulaanbaatar city. We can see the conductivity increases upstream to downstream, particularly after the capital city. Globally, pH decreases, and the river has a good oxygenation. We can also notice that all along the river, there are, in general more and more elements.

It may be caused by tannery industries, for example, which can explain chromium presence after Ulaanbaatar. And, as I said earlier, the sewage treatment plant of Ulaanbaatar is not very efficient, and it can maybe explain why there are oxygen variations.

Table 2: Some analysis results of L'eau-tarit study in 2009, on the Tuul river

Numéro	Date de prélèvement	Rivière étudiée	Caractéristiques				Métaux lourds LERES						
			pH	Temp. (°C)	Cond. (µS/cm)	O ₂ (mg/L)	As (µg/L)	Cd (µg/L)	Cr (µg/L)	Cu (mg/L)	Hg (µg/L)	Pb (µg/L)	Zn (µg/L)
B1-3	20 juin 2009	Tuul	7,900	5,800	36,300	9,500	0,3	<	<	<	<	<	90
B1-10	28 juin 2009	Tuul	7,200	8,000	54,000	7,100	5,5	<	7	<	<	5	80
B1-11	30 juin 2009	Tuul	7,000	14,000	66,000	6,900	1,7	<	<	<	<	1	30
B6-4	27 septembre 2009	Tuul	7,50	9,80	46,00	11,80	0,7	<	<	<	<	<	90
B6-5	27 septembre 2009	Tuul	6,70	10,30	61,00	10,50	0,7	<	<	<	<	<	110
B6-6	27 septembre 2009	Tuul	7,15	11,30	198,00	10,50	0,9	<	<	<	<	<	130
B3-39	13 août 2009	Tuul	6,80	19,10	140,00	7,50	2,2	<	11	<	<	2	140
B3-35	12 août 2009	Tuul	7,10	22,00	208,00	9,00	3,5	<	5	<	<	1	130



The macro-invertebrates study gives us those results, reported on the following table. The faunistic lists and sampling forms of those 3 samples are reported in annexes VI and VII.

Table 3: Tuul river's macro-invertebrates results

	Tuul before Gachuurt	Tuul after Gachuurt	Tuul after UB
Sampling date	28/07/2010	27/07/2010	08/08/2010
pH	7,9	7,9	7,3
O2 (mg/L)	6,05	6,5	1,7
Conductivity (µS/cm)	77	94	243
Temperature (°C)	21,6	19,5	18,4
Indicator taxon	Perlidae	Perlodidae	Ephemerellidae
Variety	17	14	5
IBGN mark (/20)	14	13	4

According to those results, we can clearly observe that there is something happening after the Mongolia capital city. Pollution-sensitive taxons had disappeared, given way to pollutant resilient species.

We had calculated the IBGN French standard marks thanks to a table (annexe VIII). The results we had observed (14/20 and 13/20) enable us to say that before Ulaanbaatar city, the Tuul river has a good water quality. Plecoptera invertebrates are well representative, which means there is no important pollution issues. But the variety is not very good on the two sites before the city. There are not many different kinds of invertebrates, and some orders aren't present, as Coleoptera. It is maybe due to the really hard temperature variations the river can have during a year.

14

So before the Tuul river runs through Ulaanbaatar, the water has a good quality. The physico-chemical parameters can confirm that theory, even if the oxygenation is not very good. But at those stations, the Tuul river is becoming larger and is receiving more and more solar energy. The water conductivity is low, which means there is not a lot of element dissolved in it, and the pH is normal.

But after Ulaanbaatar city, Tuul river's conductivity had increased, and there is almost no oxygen left, dissolved in the water. The river is full of algae, and smell really bad. Obviously, it is an organic pollution, maybe caused by the inefficient sewage treatment plant of Ulaanbaatar.

The macro-invertebrates analysis shows this phenomenon. Nearly every kind of invertebrate had disappeared, except Oligochaeta or Diptera which can resist to significant pollution. The IBGN mark is 4/20, which translates the river is really impacted by anthropic factors, and has really bad water quality.

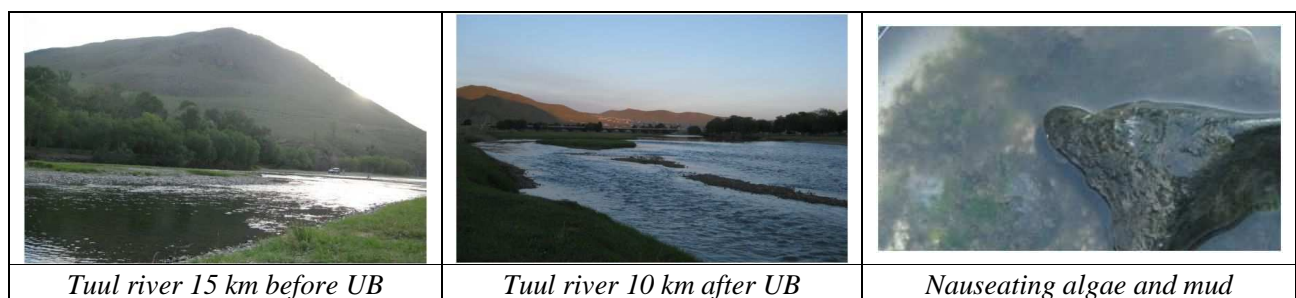


Figure 8: Pictures of Tuul river - 2010



This little study on the Tuul river enables me to introduce to UMMRL people to a new kind of analysis. I had increase their awareness of water pollution research. I gave them the keys to begun to work on their own. Analysing the Tuul river was a great example, because anthropic impacts are importants and have huge consequences on the benthic fauna.

The decrease of the IBGN marks between the 2 stations might be due to industries, as tanneries, but also to the inefficient sewage treatment plant. It brings different kind of pollutants to the river, organic and inorganics, and both are killing macro-invertebrates.

To finish on a positive note, Mongolia is a country with few inhabitants. Ulaanbaatar is the only big city of the country. The Tuul river can purify itself during all it way to Russia, and nature seems to do its job well, because people are fishing Taimen about 150 kilometers after Ulaanbaatar.

V. The Russian/Mongol kids exchange week

The UMMRL had organised few days of exchange between 9 mongol kids from the Selenge aimag, and 6 Russian kids from cities next to the Baïkal lake. Aged from 11 to 18 years-old, those kids exchanged their knowledges about environment, water pollution and river quality preservation.

Munkhstetseg and I took part of their activities to show them that there is not only physico-chemical analysis to study the river water quality, but biology can also give us opportunity to observ a water deterioration. We explained them where and how we sample, showed them and sort macro-invertebrates on site with them.

We didn't take the stereo-microscope, so I showed the kids by naked-eyes which invertebrates they had just sample on the Henri Tachet book.



Figure 9: Group picture of the exchange days between Mongolian and Russian kids

They were really curious and interested of my intervention, asked me many questions and they were always ready to go in the river with me, to watch and try to sample.



I explained them macro-invertebrates study is a good way to estimate the water quality of a river, because it integrates pollution in time. Physico-chemical analysis of water are a “picture” in a precise time of the river quality. Some chemical parameters can change really quickly, whereas biological parameters can have signs of an old pollution. The children were aware of that, and they really like to discover this new method.



Figure 10: Teenagers sorting macro-invertebrates – 2010



VI. Conclusion

The summer internship I have done in the UMMRL Mongolian NGO, enables me to work on different duties. Working in this kind of structure made me realise that communication is very important, and you have to be open-mind, available, always ready to fit to foreigners culture and way of life.

The Tuul river is knowing huge consequences of industrialization. Ulaanbaatar city is the origin of many pollution on that river, and the government still doesn't apply drastic environmental laws. Monitoring of the Tuul river quality have to be more regular and local people need to be aware of their environment situation. The macro-invertebrates sampling we have made, enabled us to meet local people, and to discuss with them. Some of them were conscious of those issues, but other weren't. The UMMRL main work is to provide local people awareness of environmental issues, and to improve mongolian laws. Even if it's difficult from them to be efficient, because of their lack of means, this NGO is precious to Mongolia, and needs to get better means (technical and financial).

Training a student to make macro-invertebrates research, was a great experience. Munkhstesteg was very concerned, and get involved in our work. But logistic to go on the field wasn't good, so we need to practise more and more to be sure she will be efficient.

This kind of river monitoring is very interesting to the UMMRL, because they can do this job on their own. It is a cheaper way of analysing water quality than physico-chemical one, and they can trust their results.

This training period gived to UMMRL some biological datas of one of the main Mongolian river, and it would be good to continue training local people, and give them keys to analyse their rivers quality.

Mining issues are very important in Mongolia, and many rivers are dying because of them. But what can people do when it is the principal source of country's incomes? We have to help local NGO as UMMRL, to give them a better chance to save their country from pollution. Partnership with an European University is a great way for giving them knowlegdes, and it has to be continue in the future.



Figure 11: Ulaanbaatar city, see from West - 2009



VII. Bibliography

Scientific documents available on web :

- Teachers manual – Water Quality Monitoring in Rivers – Asia Foundation, 2008 (in English & Mongol languages)
- Good Practice Guidance for Mining and Biodiversity – International Council on Mining & Metals
- Ninja Gold Miners of Mongolia, Assistance to Policy Formulation for the Informal Gold Mining Sub-sector in Mongolia - Mongolian Business Development Agency (MBDA), september 2003
- The Mineral Industry of Mongolia – U.S. Department of Interior, U.S. Geology Survey, January 2007

Internal documents of l'Eau-tarit Association:

- Rapport de mission Mongolie 2009-2010
- Résultats bruts des analyses en métaux lourds dans les eaux et les sols réalisées durant l'été 2009 et mars 2010

Books :

- Tachet H., 2006. Invertébrés d'eau douce, Systématique, biologie, écologie. CNRS éditions, Paris.
- Мөнгбаяр Ц., 2007. Онги гол Экологи. Улаанваатар.
- Дорждэрэм Л., 2005. Франц - Монгол Толь. Урлах Эрдэм - хэвлэлийн компани, Улаанваатар
- Дорждэрэм Л., 2003. Монгол - Франц Толь. Урлах Эрдэм - хэвлэлийн компани, Улаанваатар

Norm:

- Norme IBGN NF-T90-350

Web Sites :

- United Movement of Mongolian Rivers and Lakes NGO : Protecting Mongolia's rivers, lakes and natural ecosystem. Available on : <<http://www.rivermovements.org>>
- Association L'Eau-tarit : Association de Solidarité internationale et de protection de l'environnement. Available on : <<http://leautarit.com>>



VIII. Figures and tables list

Figure 1: topographical map of Mongolia. [http://fr.academic.ru/dic.nsf/frwiki/1181153]	6
Figure 2: Mongolia aimags map and logo of local river movements[rivermovements.org]	8
Figure 3: Munkhbayer Ts. receiving the environmental goldman prize - 2007	8
Figure 4: Different pictures of local people getting interested of my work. Selenge and Bayankhongor aimags - 2009	9
Figure 5: Munkhtsetseg, Bugant soum - 2010	11
Figure 6: Munkhstesteg sampling on the Bugant river.	11
Table 1: Bugant river's macro-invertebrates results	12
Figure 7: Ulaanbaatar satellite picture, sampling points [Google earth]	13
Table 2: Some analysis results of L'eau-tarit study in 2009, on the Tuul river	13
Table 3: Tuul river's macro-invertebrates results	14
Figure 8: Pictures of Tuul river - 2010	14
Figure 9: Group picture of the exchange days between Mongolian and Russian kids	15
Figure 10: Teenagers sorting macro-invertebrates – 2010	16
Figure 11: Ulaanbaatar city, see from West - 2009	17



Annexes

Annexe I: How to do an hydrobiological sampling, following the French IBGN protocol	I
Annexe II: Hydrobiological sampling form	II
Annexe III: Identification taxons of IBGN standard	III
Annexe IV: Bugant river sampling form	IV
Annexe V: Bugant river faunistic list	V
Annexe VI: Tuul river sampling forms	VI
Annexe VII: Tuul river faunistic lists	IX
Annexe VIII: IBGN table to calculate mark	XI

