**NATIONAL UNIVERSITY OF MONGOLIA**

School of Biology and Biotechnology
Department of Botany

Tsedensodnom DEJIDMAA

# Vegetation community of Bulgan river Basin

Abstract of the thesis submitted for the degree of Master of Science of Biology

Specialization: Botany E-420205

Ulaanbaatar 2013

The present research work was carried out at the Department of Botany, School of Biology and Biotechnology, National University of Mongolia

Scientific supervisor: Ph.D. B. Oyuntsetseg
M.Sc. Ch. Oyundari

Committee:

Ph.D. Kh. Terbish
Ph.D. S. Shar
Ph.D. N. Soninkhishig
Ph.D. Ch. Gantigmaa
Sc.D. Sh. Tsooj
Sc.D. Sh. Daariimaa
Ph.D. B. Tsengel

The session of the scientific committee will be held at 10.00 AM, 12 June 2013, in the Conference Hall (Room № 376) II building of the National University of Mongolia.

The abstract of the thesis was distributed on 6nd June, 2013

Secretary of the Academic Council.....Ph.D. B. Tsengel

Department of Forestry, School of Biology and Biotechnology, National University of Mongolia.

## Introduction

The Bulgan river basin is a vital part of the ecosystems and livelihoods in the Dzungarian Gobi. It host ethnic minority populations, which depend on the use of animal and plant products supplied by the rangelands and floodplains along the river. However due to severe societal changes and the fact that the basin is part of a border region between China and Mongolia faces this region severe challenges due to increasing competition for scarce water resources and pastures both in Mongolia and China.

## Study area

Study area is located in Bulgan sum, Bayan Ulgii province , exactly is from the beginning of Bulgan river spring, going down to Bulgan sum, Khovd province were taken the study data description.

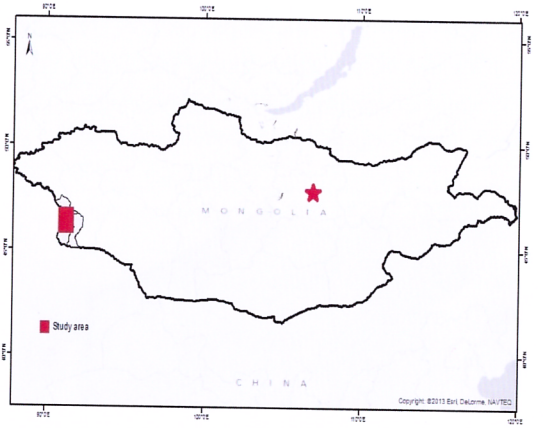



Figure 1. Location of the sampling sites

## Study samples

Tools and equipment used in sample collection are following

- Rope for sample data field organization (10x10)
- Sample data form, GPS Trimble Juno ST, digital camera
- Packets for collecting soil and plant biomass
- pH meter for soil, paperback, newspaper, labels
- scissor, plant, ruler, pen, pencil, marker

During study procedure were totally collected 203 descriptions of plants, same number of biomass and soil samples, were prepared over 100 plant herbariums. Biomass and dried samples were weighed and measured in cytoembriological laboratory on the electronic scale.

## Methods

Along Bulgan river, in every different changes of population, by using Braun-Blank (1964) methods were organized 10x10m descriptive squares and were taken linear transects, where species of plants were described according to Rachkovskaya & Volkova (1977) works, covering in percentage.

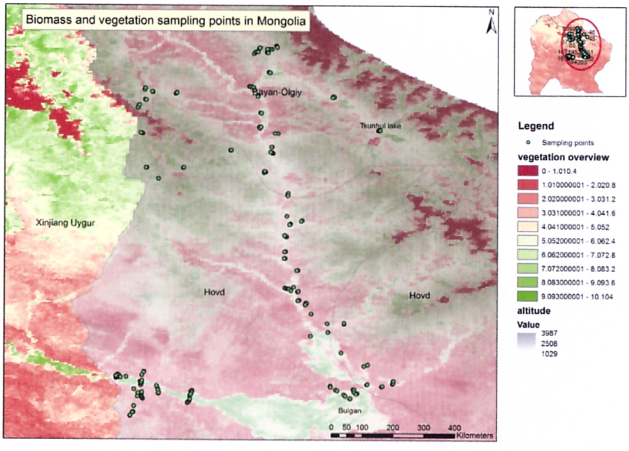
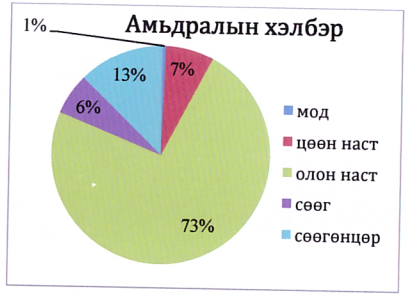



Figure 2. The sampling points

By using basic principles of square description were made brief notes, key instructions were used in the plant descriptions, were made forms, that depicted other parameters such as height, mountain side, fecal size and amount, were taken photos of them, soil samples were collected from 4 sides of the square and in the center in amount of 50-60 gr, totally 300-500 gr. soil samples were collected in a paper packet, than these were dried. From the upper surface of soil in 5-10 cm depth were taken samples, by excluding 0.5cm stones by sifting away. Statistical studies were made by using Excel software Are GIS, R software programs in soil research laboratory, the Central Geological Laboratory.

**Results**

During the plant description there were 38 families 129 geniuses, 198 species collected and indicates the abundance of families such as Compositae-(27) Compositae-27, Graminaceae-14, Rosaceae-9, Cyperaceae-8, Alliaceae-7, Ranunclulaceae-6 and *Potentilla*-9 *Artemisia*-8, *Allium*-7, *Care*x-7, *Oxytropis*-6, *Stipa*-4 are referring to a great number of species. These families and geniuses are classified ecologically in following way: dry areas-43%, cool areas-19%, moisture areas-10% were rocky.

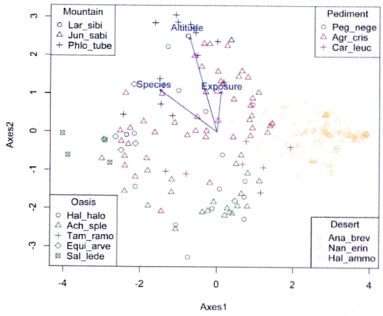



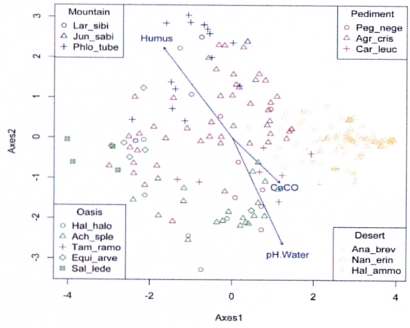
During the study work were collected over 100 plants, which were represented by 28 families, 60 geniuses, 71 species,and were described and taken photos. In this collection were included two species such as *Lythrum vigartum* L., Alliaceae-Onion family, *Allium carolinianum* DC, which were not described previously in Mongolia.

*Lythrum virgatum.*

*Allium carolinianum* DC.

Descriptions of 203 plants, 3 from high mountainous area, 3-desert steppe area, 3-desert, 5-watery low area (oasis) populations were recognized, which were separately described with its peculiarities and were compared with alive environmental factors.



## Discussion

By description of groupings, it is important the content of peculiar conditions, therefore great influence of following aspects as soil (characteristics, height, high mountain slopes, mountain sides, human and livestock influences).

Plant Descriptions of Bulgan river banks were completely different and there were found 14 populations and by comparing them with their existing conditions, there were made following result e.g. high mountain steppe *Larix sibirica* , *Phlomis tuberosa* populations were influenced by height, mountain steppe *Agropyron cristatum* populations were influenced by surface of high mountain sides, that was rich in soilhumification, desert, deserted steppe populations was rich in Calcium Carbonate ($CaCO_3$), water low area populations were dependent on water pH.

Populations depicted in study were compared with recent study results made by W. Hilbig Henrik von Wehrder , Karsten Wesche high mountain *Juniperus sabina*, *Larix sibirica*, *Phlomis tuberosa* populations were discovered in the elevation 2500-3000m above sea level and *Juniperus sabina* populations were found in Mongolian Altai mountain, Hundagat high mountainous part and grown building colony, which is similar to works of other researches (W.H.1987) and are mentioned in studies of Dzungarian Gobi plant populations, moreover those (K.W.2006) are in accordance with data, that these plants grow in upper place of Havtag mountain located in bordering zone between China and Mongolia and building a dense colony, which were forming shrub area.

## Conclusion

First during the description of plants , there were studied totally 38 families, 129 geniuses,198 species, which were registered by a number of families as Compositae-27, and Graminaceae-14, Rosaceae-9, Cyperaceae-8, Alliaceae-7, Raunculaceae-6 and the number of species *Potentilla-9, Artemisia-8, Carex-7, Oxytropis-6, Stipa-4* were registered.

During the study were collected over 100 plants of 28 families, 60 geniuses, 71 species from Bulgan river, Dzungarian Gobi, Mongolian Altai mountain area that were described and taken photos :

There were registered newly L of Tuivna family Lythraceae, *Lythrum virgatum* L., (R.Tungalag) Alliaceae-Onion family *Allium carolinianum* DC. (Nicolai Friesen)

There were described from high mountains steppe *Juniperus sabina, Larix sibirica, Phlomis tuberosa* 3 from mountain our steppe *Agropyron cristatum, Caragana leucophloea, Peganum nigellastrum*3, from desert steppe *Anabasis brevifolia, Nonaphyton erinaceum, Haloxylon ammodendron* 3,from watery low area (oasis) *Equisetum arvense, Halimodendron halodendron, Achnatherum splendens, Salix Ledebouriana, tamarix ramosissima* -5, totally 14 populations. By comparing populations by height, mountain sides richness of species and soil, moreover high mountainous steppe Larix sibirica, Phlomis tuberose populations were impacted by height greatly and for mountainous steppe's *Agropyron cristatum* population was influenced by mountain sides. At the high mountainous steppe the number of species is enriched greatly.

In changes within plant population is impacted by soil humification, Calcium carbonate ($CaCO_3$), soil pH, therefore in high mountains steppe's population is rich in Calcium carbonate ($CaCO_3$), in watery low area population is dependent on water pH.

**Acknowledgement**

We are very grateful to professor Doctor B. Oyuntsetseg, school of Biology and Biotechnology, NUM, to lecturer Ch. Oyundari, school of Geology, NUM for gaining us all possibilities to complete this research, for their wealthy and expensive theoretical and methodological advices, also to our official opponent Professor.

Especial thanks to Doctor N. Soninkhishig, supervisor of "Waterscope" project, Head of Botany department", NUM, to Doctor D. Nyambayar and all collegues, project staff.

Thanks to E. Uuriintsolmon, B. Purevdorj for helping in research expedition.

## Reference


1. Gunin, P. D., Vostokova, E. A. 1995 Ecosystems of Mongolia. Moscow.
2. Hilbig, W. 1995. The vegetation of Mongolia. Amsterdam.
3. Neuffer, B., Oyuntsetseg, B., Schamsran, Z., Friesen, N., Hurka, H., Contribution to the knowledge of the Flora of the Mongolian Altai
4. von Wehrden, H., Hilbig, W., Wesche, K. 2006a. Plant communities of the Mongolian Transaltay. Feddes Repertorium 117: 526-570.
5. von Wehrden, H., Miehe, G. Wesche, K. Plant communities of the Southern Mongolian Gobi.
6. von Wehrden, H., Wesche, K ., Tungalag, R. 2006. Plant communities of the Great Gobi B Strictly Protected Ariea, Mongolia. Mongolian Journal of Biological Sciences 4(1): 3-17
7. von Wehrden, H., Zimmermann, H., 2009. Plant communities of the summits of the Dund Saykhan mountain range (Southern Mongolia). Candolla 64: 1
8. Wesche, K., Miehe, S., Miehe, G. 2005. Plant communities of the Gobi Gurvan Sayhan National Park (South Gobi Aimag, Mongolia). Candolla.
9. Wesche, K., Ronnenberg, K., Hensen, I. 2005. Lack of sexual reproduction within mountain steppe populations of the clonal shrub Juniperus Sabina L. in semi-arid southern Mongolia. Journal of Arid Enviroments 63: 390-405.