

## **DISTRIBUTION AND GENETIC RESOURCE OF MONGOLIAN NATURAL WILD SEABUCKTHORN /HIPPOPHAE.RH/**

**Oyungerel.D<sup>1</sup>, Juuperelmaa.U<sup>1</sup>, Nasanjargal.D<sup>2</sup>, Altangoo.G<sup>1</sup>, Battumur.S<sup>1</sup>**

1-Plant Science and Agricultural Research Training Institute

2-Mongolian National Association for Seabuckthorn Growers and Producers

E-mail:Oyungerel\_2000@yahoo.com

### **ABSTRACT**

*Mongolian natural wild seabuckthorn covers 13.5 thousand hectare along six river basins of six aimags (Selenge, Bulgan, Zavkhan, Govi-Altai, Khovd and Uvs), respectively. Within the frame of the study 43 forms were selected by morphology-biological peculiarity and 21 forms were determined as selection's basic material and genetically important material and stored in the gene pool of agricultural cultivars. To see the chemical composition of natural cultivars, the samples had medium sugar, low fat and medium vitamin C content. 50-86.7% of all bushes and trees have age of over 10 years, 13-50% have 10-18 years age, this shows tree and bushes are relatively young.*

### **INTRODUCTION**

There are over 300.000 upper plants, of which 20.000-50.000 species are edible plants. Among them 5000 genus of plants are used for food and about 150 genus plants are playing the main role for food supply of humans, currently. But 3 genus plants are supplying 60% of total protein and calorie consumption.

Mongolian Nature and climate condition provides possibility of developing fruit husbandry in cool region, especially over 60 species of natural wild fruit and berries are growing in Mongolia. Therefore there is an existing possibility to develop fruit and berry husbandry basing on those natural wild fruit and berry species, which are the source of vitamins.

Gene pool of agricultural cultivars' is genetic material collection of plants, which maintain

all genetic characters of the plant. Therefore, gene pool of agricultural cultivars' is the important factor for maintaining new cultivars, varieties and selection basic materials.

Conducting of study of natural wild genetic resource, collecting of genebank, storing them alive, inheriting them to our future generation, developing of fruit orchard husbandry for the country, providing of country's fruit and berry consumption, revealing and using of hidden genetic resources of natural wild seabuckthorn are urgent issues for Mongolia.

The aim of our study is to determine seabuckthorn resource and location conduct inventory and develop guideline for seabuckthorn protection and its appropriate usage, revealing of the most useful form, and to compose genebank.

## RESEARCH METHODOLOGY

Distribution map of natural wild seabuckthorn, revealing of location and expansion field amount were determined by using data with high resolution of GIS and remote sensing. GPS system is modern integrated technology for determining location and it is an equipment, which is able to get coordinate system, location with high resolution, data about speed and time from 24 satellites during any time.

1. After primary processing in satellite channel data, ISODATA unsupervised classification 5 (ISODATA main menu) of ERDAS IMAGINE 8.4 program was used for selecting sample points by conceptual mapping of distinguishing settled area, forest, bushy area, green plant and bare ground.
2. Fruit biochemical characters were determined at the PSARTI's Biochemistry

laboratory vitamin C by Murr method, sugar content by Bertiran, oil content by Socslet, acidity by Titr method, respectively.

3. Tree and bush aging was estimated by methodology of forest pool, determining of aging (S.Dashdavaa 2009). Seabuckthorn aging was determined by following formula:
  - A. Seabuckthorn aging 1-10 was determined by
 
$$A = t + 1$$
 A-seabuckthorn age  
t-amount of branch nodules
  - B. Seabuckthorn aging over 10 years was determined by
 
$$A = t * H / H - h$$
 t- amount of branch nodules  
H- bush height, m  
h – main stem height from soil surface to first branch nodule, m

## RESULTS

It was determined that Mongolian natural wild seabuckthorn covers 13.5 thousand hectare along six river basins of six aimags (Selenge, Bulgan, Zavkhan, Govi-Altai, Khovd and Uvs), respectively. We determined sea level, longitude altitude of the geographical location

by combining GIS, remote sensing and GPS system.

43 forms were collected from those river basins and 21 forms were selected for further selection basic material.

Table 1

100 fruits weight and relationship of fruit amount in one bud			
Forms		Fruit amount in one bud	Weight of 100 fruits, g
1	Uvs-Umnugovi+Buurugiinbaruundavkharga 01	3	38
2	Uvs-Bukhmurun-Tsagaanburaa 02	4	34
3	Uvs-Bukhmurun-Tsagaanburaa 01	4	35
4	Zavkhan-Durvuljin-Kharbutniiekh 01	5	30
5	Khovd-Sumiinganuu01	3	45
6	Bulgan-Khangal-Munkhtsagaan 01	4	36
7	Zavkhan-Borkhiingol-Khukhtolgoibulan01	4	34
8	Zavkhan-Borkhiingol-Khukhtolgoibulan01	3	43
9	Zavkhan-Borkhiingol-Chatsarganatiintohoi01	3	40
10	Zavkhan-Zuriinborkhoshuu	3	42
11	Uvs-Bukhmurun-Arzgariingol 01	4	32
12	Khovd-Sumiinganuu01	6	30
13	Uvsdunndankhariinaral 01	5	31
15	Selenge-Tsagaannuur-Deed khooloinekh 01	4	31
16	Selenge-Tsagaannuur-Aral 02	4	31
18	Selenge-ZuunburenNarin 02	3	38
19	Selenge-ZuunburenTamir 02	4	35
20	Selenge-ZuunburenNorovbanzadiintokhoi 03	3	39
21	Zavkhan-Bayan tes-Khosiingol 01	3	40

As shown the estimation, fruit amount in one bud and amount of 100 fruits has negative correlation. For instance SumiinGanuu 02 form, which was grown in Bulgan river basin, has 3 fruits in one bud, 100 fruit 45 g weight. To compare with previous study, which was conducted before 40 years in 1970s, acidity and

oil content was reduced. It is obvious that climate and other factors are affected for this and this should be studied further. As a fruit biochemical analyze oil, vitamin C, sugar acidity were determined each character was grouped 3 groups as high, medium and low.

Table 2

Oil content of fruit		
	Form	Oil,%
1	Uvs-Umnugovi+Buurugiinbaruundavkharga 01	4.0
2	Uvs-Bukhmurun-Tsagaanburaa02	3.3
3	Uvs-Bukhmurun-Tsagaanburaa01	3.1
4	Uvs-Bukhmurun-Tsagaanburaa 01	3.5
5	Khovd-Sumiinganuu01	3.2
6	Bulgan-Khangal-Munkhtsagaan 01	3.9

As show the table 2, oil content in high group Seabuckthorn natural wild orchards varies 4.0-14.6 medium 36.5, in low 48.7% respectively. 105%.  
To see the result the oil content of

Table 3

Sugar content of fruit		
	Form	Sugar,%
1	Zavkhan-Borkhiingol-Khukhtolgoibulan 01	8.9
2	Zavkhan-Borkhiingol-Chatsarganatiintohoi01	8.4
3	Zavkhan-Kharganat-Mongol els03	8.3
4	Zavkhan-Zuriinborkhoshuu 01	8.3
5	Uvs-Bukhmurun-Arzgariingol 01	7.2
6	Khovd-Sumiinganuu01	6.1
7	Uvs-Dundgol-Dankhariinaral01	6.0
8	Govi-Altai-Aruvurchatsarganat	7.8

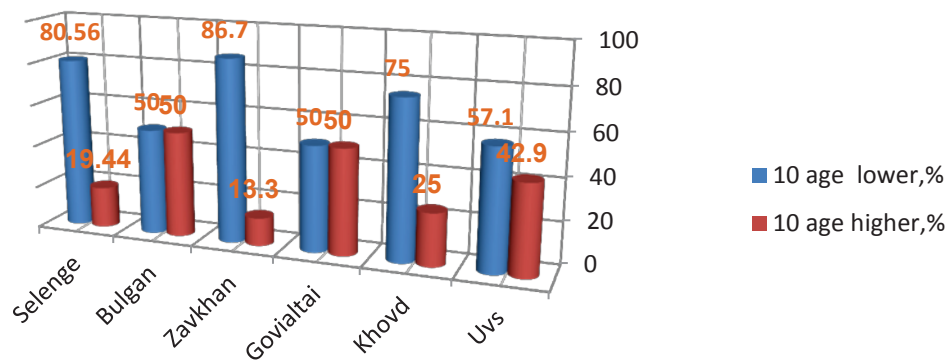
General sugar content was varied 6.0-8.9%. Arzgariingol were looked with orange to tod Seabuckthorn fruit of Zavkhanaimag yellow color.  
Borkhiingol, Mongolian sand, Uvsaimag

Table 4

Vitamin "C" content of fruit		
	Form	Vitamin C,%
1	Uvs-Umnugovi-Buurugiinbaruundavkharga01	251.7
2	Selenge-Tsagaannuur-Deed khooloinekh 01	237.6
3	Selenge-Tsagaannuur-Aral 02	228.8
4	Zavkhan-Borkhiingol-Khukhtolgoibulan	211.2
5	Selenge-ZuunburenNarin02	197.1
6	Selenge-ZuunburenTampir02	184.8
7	Selenge-ZuunburenNorovbanzadiintokhoi03	161.9
8	Zavkhan-Bayan tes-Khosiingol01	181.3

Vitamin C content varied 251.7-56.3mg/% or 107-149.6% 30% of total samples was high group, 3.7% medium, 33% in low group. This indicates that vitamin C content is in medium

group, generally. To see by aimags, seabuckthorn fruit of OrkhonSelenge river basin has high vitamin C content.



Picture 1. Seabuckthorn aging

50-87.6% of total natural wild seabuckthorn has over 10 years age, 13-50% has 10-18 age. To see this result trees and bushes are relatively young. Potential age of fruit productivity for fruit and berry plant is 7-25

years. Seabuckthorn aging in selenge aimag is 7-20, this is related to good regrowth.

Selected 21 forms were taken local MK numbers, registered according to International cultivars, stored in the genebank of the PSARTI.



Picture 2. Samples, stored in the genebank

## RESULTS

1. Within the frame of the study, 43 forms were selected by their morphology biology characters. It was determined that 21 forms are important selection basic material and genetic resource and they stored in Agricultural cultivars genebank.
2. By chemical composition, Mongolian natural wild seabuckthorn has medium

sugar, low oil, and medium vitamin C content, respectively.

3. 50-87.6% of total natural wild seabuckthorn has over 10 years age, 13-50% has 10-18 age. To see this result trees and bushes are relatively young.

## **REFERENCE**

1. Research result report of distribution of Mongolian natural wild seabuckthorn and genetic resource. Darkhan-Uul aimag 2013
2. Research methodology for distribution of Mongolian natural wild seabuckthorn and genetic resource. Darkhan-Uulaimag 2013
3. Devyatin V. A, Zaharova M. G. "About vitamin value of seabuckthorn fruits. Moscow, 1956, p. 26-33
4. Dorjgotov J. "Fruit and berry of Mongolia" Ulaanbaatar, 1976, p.36-43
5. Eliseev I. P. "Soil condition Impact on seabuckthorn resistance in black earth. /Genesis of soil fertility/. Gorkii, 1983.