

## **Cytogenetical Analyses of Some Astragalus Species Spreading in the Nakhchivan Autonomous Republic Territory**

DASHGIN GANBAROV

MUSA PIRIYEV

ALIYAR İBRAHIMOV

TOFIQ ALIYEV EMIN MAMMADOV

Nakhchivan State University

### **Abstract:**

*The article refers to the study of a set of chromosomes of Astragalus (Leguminous) species spreading on the Nakhchivan Autonomous Republic territory. For the research there have been used the seeds of 24 species belonging to the Astragalus L. karyology genus. The chromosomal sets of 17 species have been studied, buton studying the chromosomal sets of 7 species there have been observed a number of problems. There have been taken photos of a few species in the metaphase stage.*

**Key words:** astragalus, genus, species, chromosome, natural

### **INTRODUCTION**

Investigation of the biological diversity of the regions on scientific bases, the effective use, rehabilitation, protection are actual problems of scientific and economic importance. The problems require taking the complex measures for the protection and restoration of natural resources. Bio-resources take special place among the natural resources and flora and as a part of the national wealth they provide the basis for the

peoples' needs. With their bio-resources signs the leguminous plants are of great importance in the human life. They are used as food in everyday life, as fodder for animals, in the form of drugs for disease-fighting, in the prevention of the fields becoming deserts and erosion. At the result of the changings in the landscape, urbanization and industrial development, misusing from the soils, some unique and polymorphic species including into the *Astragalus* L. genus are gradually disappearing. So, it is required to investigate the botanical and karyosystematic peculiarities of the species including into the territorial flora.

## **MATERIAL AND METHOD**

The cytogenetic investigations of the samples were carried out on some of meiotic and mitotic chromosomes got by standard classical methods (Паушева [2]), (Пухальский [3]) and on the basis of some of their temporary substances prepared on their modifications. For the karyological researches there have been used the seeds of 24 species of the *Astragalus* L. genus, collected from the Nakhchivan Autonomous Republic territory. In order to determine the number of chromosomes in somatic cells, the grains were moistened in the Petri containers for a day, then the germinated grains were kept in the fridge for a day, and then they were moved into the 25°C temperature thermostat and kept there for days, sometimes more (even months) until there appeared the roots.

The roots of 1,0-1,5 cm in length were cut and kept in the water saturated solution of alfabromnaftalin for 2 hours or in 0.2% kolkhisin (Sigma, USA) solution and washed under running water for 30 minutes. The roots after keeping in the icy water for 1 hour were kept in the fixator in 3:1 ratio of alcohol-acetic acid for a day, and then kept in the 70% alcohol solution, in the refrigerator until they were used.

To determine the chromosomal complex, the roots were dyed by asetocarmin, temporary dipping them in a solution of acetic acid 45% they were studied under the Orthoplan Leitz (Germany) and Motic (China) light microscopes. There were taken photos of metaphase plates on which the chromosomes could be calculated.

## **EXPERIMENTAL PART**

The species belonging to the *Astragalus* L. genus are the ancient polymorphous for the Autonomous Republic flora and they play a key role in the flora. Species belonging to the genera have been adapted to the continental climate of the Nakhchivan Autonomous Republic. In order to determine the genetic criterion of the species, it is of great importance to research the karyotypes of some wild plants that have very few chromosomes.

It should be noted that, the species belonging to the *Astragalus* L. genus have been studied cytogenetically very little. While studying the karyotype of species belonging to the *Astragalus* L. genus, there have been applied to the information of A. Magulayev (1), A. K. Sitin (4), E. G. Filippov (5) and other authors. It is very important to study the populations of the species that have spread in different wide areas. While researching the spreading of *Astragalus* L. species on altitude zones, there have been identified the certain regularity. Thus, as the altitude increases, in the vegetative and generative organs of species, there have been determined some changes in the anatomical structure.

Therefore, there have been studied the chromosomes sets of a number of species. The number of chromosomes is the main characteristics of the karyotype. While compiling the chromosomal ideogram, it should not necessarily complete the chromosomal identification.

For the karyolitic research, there have been used the seeds of 24 species of *Astragalus* L. genus collected from Nakhchivan Autonomous Republic territory. We have to note that (*Astragalus* L.) the haploid chromosome set of the *Astragalus* L. is  $n = 8$ . At the result of the karyolitic analysis of the studied species, there have been determined that, 12 of them are diploid ( $2n = 16$ ), three are tetraploid ( $2n = 32$ ), one is heptaploid ( $2n = 56$ ) and one is octoploid ( $2n = 64$ ) (Table 1).

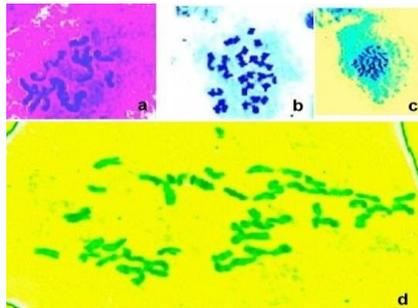
**Table 1. Karyolojic analysis of the species belonging to the *Astragalus* L. genus collected from Nakhchivan AR**

S/s	Names of the samples	2n
1.	<i>A. flavirubens</i> (Al. Theod., Fed. &Rzazade) Podlech	32
2.	<i>A. candolleanus</i> Boiss.	32
3.	<i>A. polyphyllus</i> Bunge	-
4.	<i>A. oleifolia</i> (DC.) Podlech	-
5.	<i>A. falcatus</i> Lam.	16
6.	<i>A. aduncus</i> Willd.	-
7.	<i>A. kochianus</i> Sosn.	16
8.	<i>A. glycyphyllos</i> L.	16
9.	<i>A. lagurus</i> Willd.	32
10.	<i>A. cicer</i> L.	64
11.	<i>A. odoratus</i> Lam.	-
12.	<i>A. arguoides</i> G. Beck. ex Stapf	-
13.	<i>A. cornutus</i> Pall.	16
14.	<i>A. prilipkoanus</i> Grossh.	56
15.	<i>A. montis-aguilis</i> Grossh.	-
16.	<i>A. alpinus</i> L	16
17.	<i>A. mesites</i> Boiss. &Buhse	16
18.	<i>A. regelii</i> Trautv.	16
19.	<i>A. karjagini</i> (Boiss.) Podlech.	16
20.	<i>A.glycyphylloides</i>	16
21.	<i>A. taxhtadzhjanii</i> Grossh	16
22.	<i>A.tribuloides</i> Delile	16
23.	<i>A.pineterium</i>	-
24.	<i>A. nachitschevanicus</i> Rzazade	-

As seen from the table, the *Astragalus* L. genus is also included into the poliploid row. By some reasons, it was not possible to identify the chromosomal sets of remaining 7 astragalus species. Minority of the mitotik division of the seeds, being down their germinating ability, namely are the same reasons. So,let us note that in spite of some astragalus species are kept

in water for months, only after 4-5 months it was possible to get 2-3 sprouts and these are not enough for the sitogenetik investigations.

Out of the investigated astragals, in the apical meristem cells of the following species of *A. karjagini* (Boiss.), Podlech., *A. flavirubens* (Al. Theod., Fed. & Rzazade) Podlech., *A. prilipkoanus* Grossh., *A.candolleanus* Boiss. there has been taken the photo of mitoz division of the metafaza stage.



**Picture 1. a) *A.karjagini*, b) *A.flavirubens*, c) *A.candolleanus*, d) *A.prilipkoanus***

So, at the result of the karioloji researches there have been determined that the following species as *A.falcatus* Lam., *A.kochianus* Sosn., *A.glycyphylloides* L., *A.cornutus* Pall., *A.alpinus* L., *A.mesites* Boiss & Buhse, *A.regelii* Trautv., *A.karjagini* (Boiss.) Podlech., *A.glycyphylloides*, *A.taxhtadzhjanii*, *A.tribuloides* Delile are diploids ( $2n=16$ ); *A.flavirubens* (Al. Theod., Fed. & Rzazade) Podlech., *A.candolleanus* Boiss. and *A.lagurus* Willd. are tetraploids ( $2n=32$ ); *A.prilipkoanus* Grossh. is heptaploid ( $2n=56$ ) and *A.cicer* litre is octoploid ( $2n=64$ ).

## REFERENCES

1. Магулаев А.Ю Числа хромосом некоторых видов *Astragalus* флоры Кавказа//Бот. журн. 1989. Т. 74, № 10. С. 1519-1521

2. Паушева З.П. Практикум по цитологии растений. М.: Агропромиздат, 1988, 271 с.
3. Пухальский В.А., Юрцев В.Н., Соловьев А.А. Цитология и цитогенетика. Руководство к лабораторно-практическим занятиям. Учебное пособие, М.: МСХА, 2004, 118 с
4. Сытин А.К. “Астрагалы (*Astragalus* L., *Fabaceae*) Восточной Европы и Кавказа: систематика, география, эволюция” док. био. наук ... diss. автореф. Санкт-Петербург, 2009, 48 с.
5. Филиппов Е.Г., Куликов П.В., Князев М. С. Числахромосомных видов *Astragalus* и *Hedysarum* (*Fabaceae*) флоры России // Бот. журн. 2008. Т. 93, № 93. С. 1614-1619. 272.