

MITOTIC CHROMOSOMES STUDIES IN MEDICINAL PLANTS: 1. *HIPPOPHAE RHAMNOIDES* (2N = 24)

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Abstract: Our study is focused on *Hippophae rhamnoides* karyotype, as a part of an extended project of our laboratory, project concerning medicinal plants karyotypes.

INTRODUCTION

The chromosomes number and type's changes, due to aneuploidy, polyploidy, interspecific hybridization or simply to the restructurations by deletions, inversions, duplications and translocations can be easily distinguished by cytogenetic analysis. On the other hands, karyotyping represents an important step in investigation and characterization of any vegetal and animal species. Today, when we can observe an increasing interest on natural remedies, analysis of medicinal plants, also from karyological point of view, represent an important goal of scientific research.

THE AIMS OF INVESTIGATION

Our study intends to determine karyotype of a medicinal plant – *Hippophae rhamnoides*. Our data represent a part of an extended project of our laboratory, project concerning medicinal plants karyotypes

MATERIALS AND METHODS

Hippophae rhamnoides seeds: cultivar from Agronomic Institute Iasi. This cultivar is well characterized as productivity, soil and water requirements.

Laboratory phase: germination in Petri dishes, on filter paper wetted with distilled water, at room temperature, in the dark. When roots achieved 1 – 2cm length, the material was removed out and colchicines 0,2% treated for 2 hours, then fixed in Carnoy fixator, for 24 hours. All subsequent steps were performed according literature (Bara, 1993; Marc et al., 2002). The staining was performed with Carr (modified Schiff reactive) (Cimpeanu et al., 2002). Photography was taken with a Nikon Eclipse 600 bright field microscope, with a digital camera CoolPix Nikon. Images were Adobe Photoshop 5.0 processes.

RESULTS AND DISCUSSIONS

In all analyzed mitotic metaphases the chromosome number of *Hippophae rhamnoides* was 24 ($2x=24$) according literature data (Cireasa and Dascalu, 1983).

The biometric study of the karyotype settled on arms ratio, arms difference, centromeric index and relative length it comes out that: there are one chromosomes pair with strictly median centromeric region (M type – pair X), nine chromosomes pairs with median centromer (m type – pairs I, II, IV, V, VI, VII, VIII, IX, XI) and two pairs with sub median morphology (sm type – pairs III and XI).

Total chromosomes length is between 4,68 μ m (pair I) and 1,85 μ m (pair XII). The decrease of length are of 0,34 between pairs I and II, 0,73 between pairs III and IV and only 0,01 between pairs XI and XII.

The relative length of all twelve chromosomes pairs are between 55,19 and 139,39; centromeric index has values between 32,22 and 48,45, and the total length of the haploid set is 33,61.

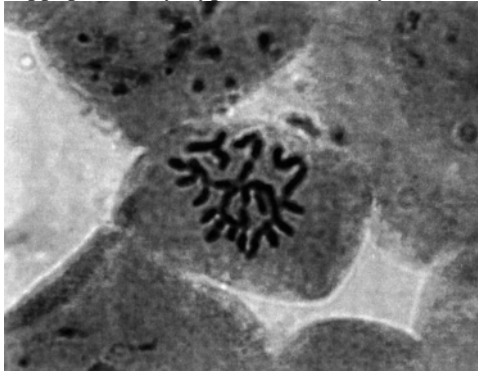
Our study reveals the asymmetric aspect of *Hippophae rhamnoides* karyotype, according the principles of symmetry and asymmetry of karyotypes (Stebbins, 1971). We consider that this aspect confirm the relative evolutive superiority of Hippophae karyotype.

CONCLUSIONS

Chromosome number in *Hippophae rhamnoides* is 24.

The chromosomes are sub median, median and median stricto sensu, in respect to their centromeric regions position.

Hippophae karyotype is relative asymmetric.



Metaphase (up) and karyotype (down) at *Hippophae rhamnoides*

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Table I Chromosomes characteristics at *Hippophae rhamnoides*

Pair	Type	Total length (µm)	Short arm (µm)	Long arm (µm)	Arms ratio	Centromeric index	Relative length
I	m	4,68	1,52	2,07	1,35	32,55	139,39
II	m	4,43	1,40	2,04	1,46	32,22	129,27
III	sm	3,78	1,37	2,38	1,73	36,32	112,61
IV	m	3,05	1,12	1,79	1,59	36,65	90,89
V	m	2,74	0,98	1,59	1,61	35,94	81,52
VI	m	2,65	1,02	1,46	1,42	38,67	78,84
VII	m	2,49	0,96	1,45	1,50	38,67	74,23
VIII	m	2,12	0,99	1,08	1,08	46,82	63,22
IX	m	2,07	0,86	1,07	1,23	41,68	61,73
X	M	1,94	0,94	0,94	1,00	48,45	57,72
XI	m	1,86	0,81	1,07	1,32	43,54	55,34
XII	sm	1,85	0,62	1,25	2,00	33,69	55,19

Haploid set length = 33,61