MITOTIC CHROMOSOMES STUDIES IN MEDICINAL PLANTS; L. *ECHINACEA PURPUREA* (L) MOENCH (2N = 22)

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Key words: metaphase, chromosomes, satellites, karyotipe, *Echinacea purpurea* (L.) Moench.

Abstract: The metaphase contains 22 chromosomes. We have found 3 types of chromosomes. This species presents au evolved karyotype.

INTRODUCTION

The chromosomes number and type are very important to caracterize a species.

Today, where we can observe are increasing interest on natural remedies, analysis of medicinal plants, also from karyological point of view, represent are important goal of scientific research.

Our study intends to determine karyotipe of a medicinal plant – *Echinacea purpurea* (L) Moench.

MATERIAL AND METHOD

Biological material: year old seeds belonging to the species of *Echinacea purpurea* (L) Moench and harvested in 2003 in the Department of Agricultural and Zootechnic Researches, Secuieni – Neamţ.

The germination has been assured in Petri plates, on filter paper, soaked in distilled water, at 24°C±2°C room s temperature.

When the little roots reached 10-15mm height, they were harvested and it was being used a treatment with 0,2% colchicines, at room s temperature, for 2 hours, after words they kept in distilled water for 2 hours. For hydrolysis it was used a 50% hydrochloric acid solution, for 10 minutes and a Carr reagent for coloring.

The solutions were done, using the squash method, the reading was made to the microscope with 20x object lens and they were photographed with the immersed 100x object lens, using the Nikon Eclipse 600 camera, and the digital camera Nikon Cool Pix, with a 1600 x 1200 dpi resolution.

The image was processed by the Adobe Photoshop programmer.

RESULTS AND DISCUSSIONS

The chromosomes have been grouped according to the ratio between the long arm and the short arm, to the centromeric index and to the difference between the stems / branches and the relative length of the chromosomes.

The number of chromosomes founded is 2n = 22 in all the studied metaphases.

After the analysis of the best metaphase (fig. 1) with a minimum number of superposed chromosomes, there were established 11 pairs of chromosomes, which have been arranged by a process of reducing the average of their total length.

As we notice from table 1, the average of total length was between 5,94 μm (the 1st pair) and 3,34 μm (the 11th pair).

The limits of variability have been almost the same, which confirms the authenticity of the establishment of the pairs of homologues.

As it concerns the decreasing average of the total length from the first pair to the last one, it was on unequal one. The highest value (0,92 μm) was recorded between the 1st and the 2nd pair while the lowest one (0,01 μm) was between the 2nd and the 3rd one.

The difference between the arm was between 0,73 μm (the 2nd pair) and 1,99 μm (the 8th pair). The ratio between the long arm the short arm and the criterion to establish the homologues were between 1,34 μm (the 2nd pair) and 3,05 μm (the 8th pair) and the centromeric index varied between 42,79 μm (the 5th pair) and 75,12 μm (the 8th one).

The relative length was between 12,24 μm (the 1st pair) and 6,88 μm (the 11th pair). At the 5th pair there have been noticed satellites whose dimensions were between 0,98 – 0,95 μm .

CONCLUSIONS

Chromosomal number in *Echinacea purpurea* (L) Moench is 22.

At the 5th pair there have been noticed satellites.

Considering the fact that we have found 3 types of chromosomes (median, submedian, subtelocentric) nr can say that this species presents an asymmetrical, evolved karyotype.

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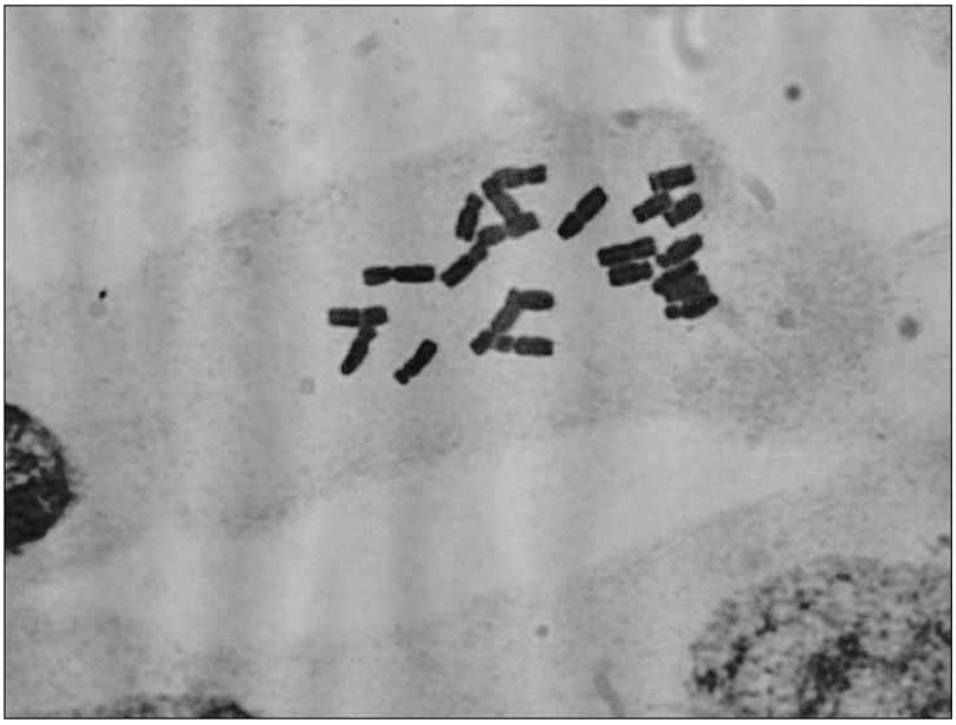

Figure 1 Metaphase at – *Echinacea purpurea* (2n=22)

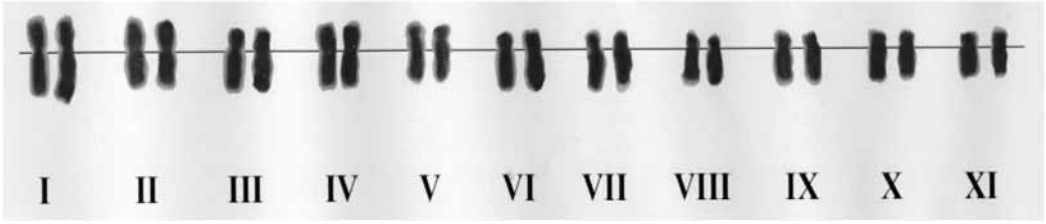

Figure 2 Karyotype at *Echinacea purpurea* (2n=22)

Table I Chromosomes characteristics at *Echinacea purpurea* (2n=22)

Chromosomes		Total length		Long arm		Short arm		Arms rapport A_l/A_s	Arms sum	Arms difference (μm)	Centro-metric index (%)	Relative length	Satellites	
Pair	Type	μm	Variability limits (μm)	μm	Variability limits (μm)	μm	Variability limits (μm)						μm	Variability limits (μm)
I	m	5,94	5,99-5,90	3,55	3,61-3,49	2,38	2,37-2,40	1,49	5,93	1,17	59,76	12,24		
II	m	5,02	5,09-4,96	2,86	2,92-2,80	2,13	2,16-2,10	1,34	4,99	0,73	56,97	10,35		
III	sm	5,01	5,06-4,96	3,35	3,40-3,31	1,68	1,71-1,65	1,99	5,03	1,67	66,86	10,33		
IV	m	4,85	4,87-4,84	2,92	2,95-2,89	1,89	1,92-1,86	1,54	4,81	1,03	60,20	10,00		
V*	sm	4,58	4,75-4,42	1,96	2,04-1,89	1,66	1,77-1,56	1,81	3,62	0,30	42,79	9,44	0,93	0,98-0,95
VI	sm	4,33	4,36-4,30	2,83	2,86-2,80	1,50	1,56-1,44	1,88	4,33	1,33	65,35	8,92		
VII	sm	4,13	4,21-4,06	2,90	2,95-2,86	1,15	1,20-1,11	2,52	4,05	1,75	70,21	8,51		
VIII	st	3,94	4,00-3,88	2,96	3,01-2,92	0,97	0,99-0,96	3,05	3,93	1,99	75,12	8,12		
IX	sm	3,77	3,85-3,70	2,68	2,71-2,65	0,99	1,05-0,93	1,83	3,67	1,69	71,08	7,77		
X	sm	3,58	3,61-3,55	2,63	2,71-2,56	0,90	0,90-0,90	2,92	3,53	1,73	73,46	7,38		
XI	sm	3,34	3,37-3,31	2,29	2,34-2,25	1,02	1,05-0,99	2,24	3,31	1,27	68,56	6,88		

*Chromosomes of satellites