

# THE STUDY OF MITOTIC CHROMOSOMES AT THE *GLAUCIUM FLAVUM* CR(2N=12) AND *CHELIDONIUM MAJUS* L (2N=12) SPECIES

CLAUDIA VORNICEANU, ION I. BĂRA, ALIONA MORARIU, NAELA  
COSTICA

**Key words** -*Glaucium flavum* Cr., *Chelidonium majus* L., cromosomi, mitoză

**Abstract:** The analyzed species have  $2n=12$ . *Chelidonium majus* species has bigger chromosomes than *Glaucium flavum* species. *Chelidonium majus* has a pair of chromosomes with satellites. Both species have a symmetrical, less evolved karyotype.

## INTRODUCTION

Having as purpose to determine the number of the chromosomes of some species, their typology, the arrangement in the karyotype and the idiogram's structure, the cytogenetics studies are very important to explain some aspects about the filiation in a family.

Therefore, we intend to emphasize the possible tendencies of the karyotype's evolution, within the two species mentioned above, considering the fact that these ones belong to the same family and there are many disputed data in the theoretical studies concerning the links between the two species: *Glaucium flavum* and *Chelidonium majus*.

## MATERIAL AND METHODS

The seeds were obtained from Botanical Garden of Iasi University, 2002 yield. The germination was assured in Petri dishes, on filter paper moistened with distilled water, in room conditions (22-24°C).

When the roots had 0.5-1 cm length, the seeds were transferred in 0.2% colchicines solution, for two hours. After that the seeds were transferred again, for other two hours, on filter paper in Petri dishes. The fixation was effectuated 24 hours in alcohol/acetic acid (3/1) solution. The hydrolysis was assured in 50% HCl solution, for 8-10 minutes. Staining was effectuated by Carr solution.

The microscopic slides were prepared by squash method and were examined at 100x immersion objective and photographed by Nikon kamera at Nikon Eclipse 600 microscope.

## RESULTS AND DISCUSSIONS

Both species, *Glaucium flavum* and *Chelidonium majus*, within the *Papaveraceae* family, have as basic number of chromosomes  $x=6$ , the diploid number being  $2n=12$ . According with the data from literature, we found the same number ( $2n=12$ ) in all investigated populations.

The chromosomes of *Glaucium flavum* species, were grouped into two types – **M** and **sm** (see the table), showing that this species have a symmetrical, unevolved and stable karyotype.

The chromosomes length, in analysed metaphases is comprised between 1.30 and 1.78  $\mu\text{m}$  and the length of the haploid set (HSL) is of 9,05  $\mu\text{m}$ , similar to those mentioned in literature.

The arms raport varies between 1.16 and 1.74. The centromerique index, a parameter used to find out the homologous chromosomes, had the values between 37.25 (the fifth pair) and 52.43 (the fourth pair), its variability being relatively low.

As for the difference between the arms, its values were between 0.14 and 0.38  $\mu\text{m}$ . The chromosomes relative length was low, its values being between 14.80 and 18.67.

As for the *Chelidonium majus* L. species, the 12 chromosomes were also grouped into two categories but the situation was similar to that found at the species of *Glaucium flavum* Cr., namely the 5 pairs were **sm** and a pair was **M**.

Therefore, also at this species, the karyotype was symmetrical, less evolved, relatively stable, despite the fact that one could notice satellites at the first pair of chromosomes.

The chromosomes total length has the values between 1.96  $\mu\text{m}$  and 2.87  $\mu\text{m}$ , while the relative length varies between 13.80 and 20.21. The length of the haploid set (HSL) is 14.20, higher than at the species of *Glaucium flavum*.

The arms ratio varies between 1.21 and 2.93, and the arms difference has the values between 0.19 and 1.40  $\mu\text{m}$ . The centromeric index is between 25.52 (the first pair) and 47.40 (the sixth pair).

### CONCLUSIONS

Both analyzed species have  $2n=12$ , similar data to those of the literature. The chromosomes of the *Chelidonium majus* species are bigger than those of the *Glaucium flavum* species.

*Chelidonium majus* has a pair of chromosomes with satellites.

Both species have a symmetrical, less evolved karyotype.

### BIBLIOGRAPHY

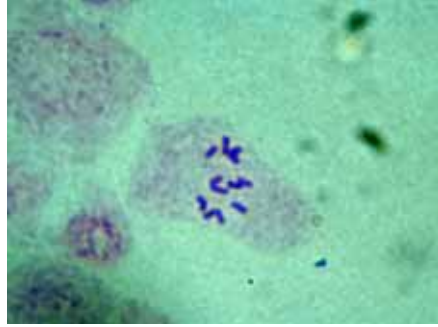
**Băra I. I., Truță Elena, Albu I., 1990.** *Cytogenetic proofs of the evolution in the Papaveraceae family. The diversification of the karyotype in Glaucium flavum Cr (2n=12)*, An. Șt. ale Univ. "Al.I.Cuza" Tom XXXVI, s II a, Biologie : 99-102

**Băra I. I., Vantu Smaranda, Colf Viorica, 1991.** *Sur une origine possible des trois nombres de base les plus fréquents dans la famille Papaveraceae*, Bot. Helv., 129-137

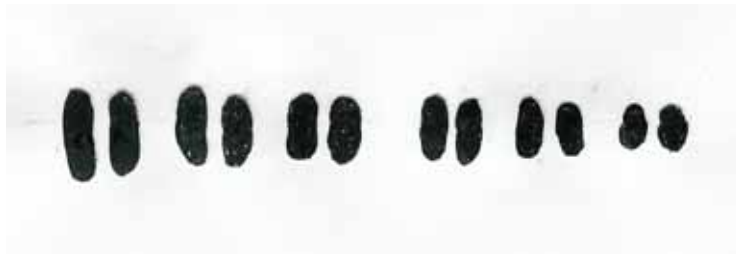
**Lavania U.C., Srivastava S., 1999.** *Quantitative delineation of karyotype variation in Papaver as a measure of phylogenetic differentiation and origin*, Current Science, Vol. 77, No.3

**Angela Pavel, Băra I. I., 1994.** *Cytogenetics and biochemistry of the species Chelidonium majus L. in vivo and in vitro*, An. Șt. ale Univ. "Al.I.Cuza" Tom XL, s II a, Biologie vegetală : 105-110

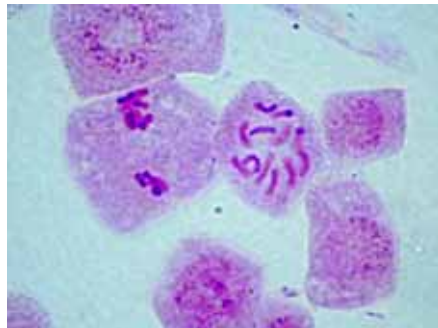
**Angela Pavel, Maria Butnaru, Vasilica Drăghici. 2000.** *Cytogenetical variability and in vitro karyotype in Chelidonium majus L. species*, Genetică și Evoluționism, Ed. Corson: 147-151



The metaphase of *Glaucium flavum* Cr. ( $2n=12$ )



The mekaryotype of *Glaucium flavum*



The metaphase of *Chelidonium majus* L. ( $2n=12$ )



The kayotype of *Chelidonium majus*

Tip	Perechea de cromosomi	Lungime totală (mp)	Limite de variabilitate (mp)	Brat lung variabilitar (mp)	Limite de variabilitate (mp)	Brat scurt variabilitar (mp)	Limite de variabilitate (mp)	Diferența brațelor (mp)	Raportul brațelor (mp)	Indexul centromeric	Indexul centromeric satelită	Lungime relativă
m	I	1,69	1,60-1,78	1,06	0,96-1,16	0,71	0,64-0,78	0,35	1,49	42,01	-	18,67
m	II	1,68	1,58-1,78	0,98	0,98-0,98	0,76	0,70-0,82	0,22	1,29	45,24	-	18,56
m	III	1,49	1,34-1,64	0,96	0,94-0,98	0,61	0,60-0,62	0,35	1,57	40,94	-	16,46
m	IV	1,43	1,38-1,48	0,88	0,84-0,92	0,75	0,72-0,78	0,13	1,16	52,45	-	15,80
m	V	1,42	1,38-1,46	0,67	0,60-0,74	0,53	0,48-0,58	0,14	1,26	37,32	-	15,69
sm	VI	1,34	1,30-1,38	0,89	0,82-0,96	0,51	0,46-0,56	0,38	1,74	38,06	-	14,80

Tabetul nr.1 - Caracteristicile metrice ale cromosomilor în metafaza mitozei la specia *Glaucium flavum*

Tip	Perechea de cromosomi	Lungime totală (mp)	Limite de variabilitate (mp)	Brat lung variabilitar (mp)	Limite de variabilitate (mp)	Brat scurt variabilitar (mp)	Limite de variabilitate (mp)	Diferența brațelor (mp)	Raportul brațelor (mp)	Indexul centromeric	Indexul centromeric satelită	Lungime relativă
sm	I	2,87	2,70-3,04	2,12	1,92-2,32	0,72	0,64-0,81	1,40	2,93	25,08	0,38-0,42	20,21
sm	II	2,63	2,48-2,78	1,79	1,74-1,84	1,01	0,96-1,06	0,78	1,77	38,40	-	18,52
sm	III	2,39	2,22-2,56	1,95	1,86-2,04	0,72	0,72-0,72	1,23	2,70	30,12	-	16,83
sm	IV	2,22	1,78-2,66	1,55	1,54-1,56	0,82	0,82-0,82	0,73	1,88	36,93	-	15,63
sm	V	2,13	2,02-2,24	1,45	1,32-1,58	0,62	0,58-0,66	0,83	2,33	29,10	-	15,00
m	VI	1,96	1,94-1,98	1,12	1,06-1,18	0,93	0,84-1,02	0,19	1,21	47,44	-	13,80

Tabetul nr.2 - Caracteristicile metrice ale cromosomilor în metafaza mitozei la specia *Chelidonium majus*