

THE STUDY OF MITOTIC CHROMOSOMES AT *PAPAVERUM SOMNIFERUM* L. SPECIES (2N=22)

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Key words — *Papaver somniferum* L., karyotype, idiogramme

Abstract — The chromosomes number in the somatic cells was 22 (2n=22). Our studies emphasized the next formula of the karyotype: **1 sm D, 1 st D, 6 sm E, 1 sm F, 2 m F.**

INTRODUCTION

This study is a continuation of some researches series about the *Papaver somniferum* L species, one of the most analyzed ones in *Papaver* genus. We intend to notice both, the features of the karyotype and the idiogramme and, also, its position in the *Papaveraceae* family, as a basis for a hypothesis about the descendants ways.

MATERIAL AND METHODS

The seeds were taken from individuals of *Papaver somniferum* L. population growing in Botanical Garden in Iasi. The seeds, collected in 2002, were soaked in Petri dishes, for germination, on filter paper, moistured with distilled water, in darkness, at 22-24°C.

When the roots had been 0.5-1 cm length, the germinated seeds were soaked in a 0.2% colchicines solution, for two hours, afterwards they were soaked again on filter paper, moistured with distilled water, for another two hours. The material thus treated was fixed, for almost 24 hours, in a mixture of absolute ethylic alcohol/glacial acetic acid, in a 3/1 proportion. After it was fixed there was done the hydrolysis, in 50% HCl, for almost 10 minutes, at room temperature. Afterwards there was realized the stain, with Carr solution (a modified Schiff stain) for at least 2 hours.

The microscopic slides were realized by the squash method, being examined at Nikon Eclipse 600 microscope, and photographed using 100x immersion objective.

REZULTS AND DISCUSSIONS

Our studies meant to notice the features of the karyotype and the idiogramme's of the *Papaver somniferum* L. species, which fit the category of *Papaver* genus species that had the basic number $x=11$, and $2n=22$.

All the metaphases that we analyzed emphasized the presence of 22 chromosomes, similar data to those of the other studies (Espinase et al., 1982; Băra et al., 1985; Băra and Wellmann, 1985; Băra et al., 1991, Lavania et al., 1999). The metric features of the *Papaver somniferum* species chromosomes, in the analyzed metaphases are represented in the table 1.

We noticed a slight difference about the types of chromosomes, 8 pairs showed under median chromosomes (**m**), 2 pairs were metacentric ones (**M**), and only the second pair showing under telocentric ones (**T**). Other authors reported the presence of 9 pairs of under median chromosomes (**m**), a pair of metacentric ones (**M**) and a pair of under telocentric chromosomes (**T**), being noticed the presence of satellites at the first pair of chromosomes

(Lavania et al., 1999), or 7 pairs of under median ones (**m**), 2 pairs of metacentric (**M**) chromosomes and 2 pairs of telocentric ones (**T**) (Băra, 1993). The data that we got didn't show the presence of satellites for either of the pairs of chromosomes.

We can say, taking into account the great morphological and biochemical variability of this species, that the population we have studied presents a symmetrical, less evolved karyotype.

Within these studies, the length of the haploid set (**HSL**) is 37.65 μm , the data being comparable with those of other studies, where the values vary depending on the sort, from 26.10 μm (Botoșani cultivar) to 45.04 μm , (ornamental variety) (Băra, 1991) or, even to 45.19 μm (Lavania, 1999). The values that we have got are comparable with those of the cultivar Cluj A (31.36 μm) and Cluj B (38.54 μm) (Băra, 1991).

The variability has been relatively low, as it concerns the relative length of the chromosomes, the values being between 11.89 μm (the 1st pair) and 6.90 μm (the 11th pair). The total medium length of the chromosomes varied between 2.60 μm and 4.48 μm .

The arms ratio (L A:S A) varied between 1.38 and 3.05, the centromeric index having values between 25.00 and 41.36, a comparable amplitude with that of that specified by other authors (Băra, 1993). The difference between the first and the last pair of chromosomes was 1.88 μm for the total length, 1.80 μm for the long arms and 0.28 μm for the short arms, comparable with the values cited in literature (Băra, 1991).

The features of the karyotype that we have got within our studies are represented in table (made in accordance with Lavania et. al, 1999).

CONCLUSIONS

The chromosomes number in the somatic cells was 22 ($2n=22$).

The length of the haploid set (HSL) was 37.65 μm .

The values of the relative length are between 11.89 (1st pair) and 6.90 (11th pair).

The total length of the chromosomes varied between 2.60 μm and 4.48 μm .

The arms ratio varied between 1.38 and 3.05, the centromeric index having values between 25.00 and 41.36.

The difference between the first and the last pair of chromosomes is 1.88 μm for the total length, 1.80 μm for the long arms and 0.28 μm for the short arms.

Our studies emphasized the next formula of the karyotype: **1 sm D, 1 st D, 6 sm E, 1 sm F, 2 m F.**

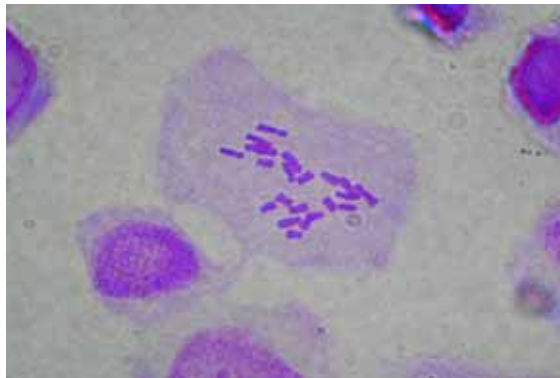
Type	Pair of chromosomes	Total length (mμ)	Variability limits (mμ)	Long arm (mμ)	Variability limits (mμ)	Short arm (mμ)	Variability limits (mμ)	Difference of arms (mμ)	Arms ratio	Centromeric index	Relative length
sm	I	4.48	3.73-5.55	3.20	2.53-3.95	1.33	0.95-1.83	1.87	2.63	29.68	11.89
st	II	4.20	3.13-5.03	3.10	2.25-3.63	1.05	0.75-1.50	2.05	3.05	25.00	11.15
sm	III	3.88	3.03-4.75	2.68	2.03-3.40	1.28	0.95-1.53	1.40	2.11	32.98	10.30
sm	IV	3.73	3.03-4.38	2.60	2.10-2.88	1.25	0.98-1.58	1.35	2.11	33.51	9.90
sm	V	3.50	2.77-4.25	2.43	1.65-2.93	1.00	0.80-1.25	1.43	2.42	28.57	9.29
sm	VI	3.28	2.53-4.05	2.33	1.68-2.90	1.05	0.90-1.28	1.28	2.20	32.01	8.71
sm	VII	3.20	2.53-4.00	2.08	1.50-3.00	1.20	0.93-1.43	0.88	1.75	37.50	8.49
sm	VIII	3.10	2.50-3.60	1.93	1.50-2.38	1.10	0.83-1.20	0.83	1.75	35.48	8.23
sm	IX	2.90	2.25-3.25	1.90	1.43-2.28	1.08	0.80-1.43	0.82	1.88	37.24	7.70
m	X	2.78	2.23-3.13	1.58	1.35-1.70	1.15	1.05-1.25	0.43	1.38	41.36	7.38
m	XI	2.60	2.23-2.95	1.40	1.05-1.75	1.05	0.73-1.23	0.35	1.39	40.38	6.90

Table 2. The karyotype's features at the *Papaver somniferum* L. (2n=22) (in accordance with Lavania et al., 1999)

The species	The group	The section	The biotope	(2n)	The karyotype's symmetry class.	HSL (mμ)	The karyotype's formula
<i>Papaver somniferum</i> L.	III	Papaver	Annaalā	22	2B	37.65	1sm D, 1st D, 6 smE, 1sm F, 2m F

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A mitotic metaphase at *Papaver somniferum* L. (2n=22)