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THE IDIOGRAMME OF FOUR CULTIVARS OF *HORDEUM VULGARE* SPECIES

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Key words: metaphase, chromosomes, idiogramme, cultivar, *Hordeum vulgare* L.

Abstract: All four cultivars (Adi, Dana, Mădălin, Miraj) have 2n=14. The chromosomes length is little bigger than that specified by other authors. The satellites are present at two pairs of chromosomes (6^{th} and 7^{th}). The karyotype is less evolved.

INTRODUCTION

The chromosomes number and type are very important to caracterize a species and its cultivars. The differences between chromosomes (length and type) may reflect sometimes the karyotype evolution and/or an explanation for differences between cultivars.

THE INVESTIGATIONS AIM

We aimed to identify possibly differences between the chromosomes of four *Hordeum vulgare* cultivars, as first step in their characterization.

MATERIAL AND METHODS

The seeds were obtained from ICCPT Fundulea (Miraj, yield 2001) and SCA Podu Iloaie (Adi, Dana, Mădălin, yield 2001).

The germination was assured in Petri dishes, on filter paper imbibed with distilled water, at 24^0 C.

The roots of 5-10 mm length were immersed for two hours in 0.2% colchicine in room conditions ($23 - 25^0$ C). After that the roots were placed again, for others two hours, on moistened filter paper.

The fixation, hydrolysis and staining (with CARR solution) were assured as in squash method.

The best metaphases were photographed at Nikon Eclipse microscope.

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RESULTS AND DISCUSSIONS

In all investigated cultivars the diploid number of chromosomes is 2n=14, four of them having satellites. The chromosomes are enough big, their length being between 8.35mμ (first pair) and 5.36mμ (7^{th} pair) for Miraj and between 7.18mμ and 5.39mμ for

Dana cultivar. The chromosomes length specified by other authors (Drăghici, 1975) vary between 6mμ and 8mμ.

As the total length of the haploid set (HSL), the Miraj cultivar is on the first place (47.85 mμ), and Dana cultivar is on the last place (43.53 mμ).

The biggest decreasing chromosome length rate (1.12 mμ) was registered at Miraj, between first and second pairs, and the lowest at the same cultivar between 4th and 5th pairs (0.14 mμ).

As values of arms ratio (L.a/S.a) the four cultivars are enough similar (between 1.37-1.53 at Adi, 1.24-1.51 at Dana, 1.17-1.55 at Mădălin and 1.05-2.33 at Miraj). So for all four cultivars the chromosomes are of **m** type, only in Miraj cultivar the second pair of chromosomes is of **sm** type. This situation is pointed out by centromeric index values, comprised between 24.61 (Miraj) and 47.01 (Miraj).

The relative length has registered values comprised between 17.45 (Miraj) and 11.20 (Miraj).

In conclusion we may affirm that are not important differencies between these four cultivars of *Hordeum vulgare* L. and, on the other hand, that the karyotype of this species are unevolved.

CONCLUSIONS

Analysing data related to the chromosomes of four cultvars belonging to *Hordeum vulgare* L. species, we can pointed out the following:

The number of chromosomes in somatic cells was constant 2n=14.

Every cultivar has satellites on chromosomes belonging to the pairs 6th and 7th.

With an exception (the chromosomes of 2nd pair of Miraj cultivar) the chromosomes are of **m** type.

The average chromosomes length registered at the four investigated cultivars is bigger than that reported by other authors.

LITERATURE

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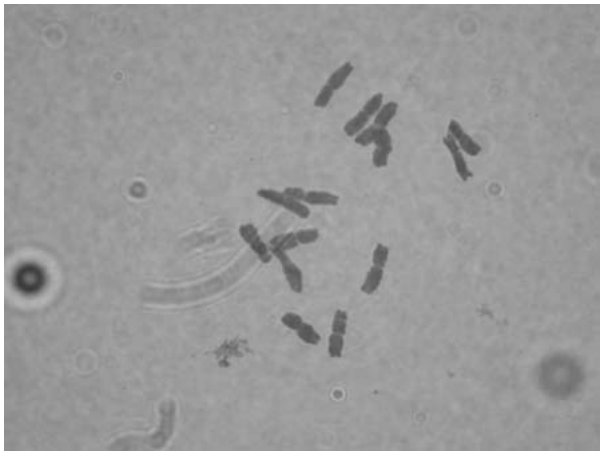

Fig. 1. The metaphase of Adi cultivar

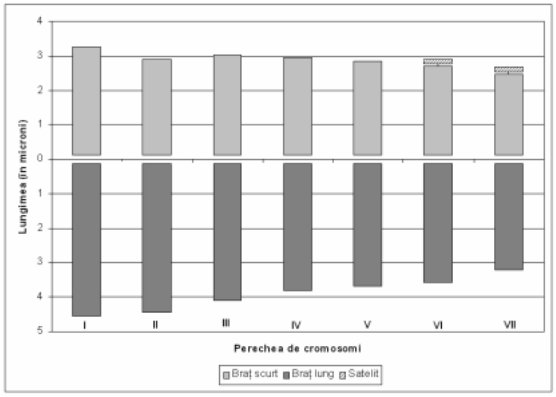

Fig. 2. The idiogramme of Adi cultivar.

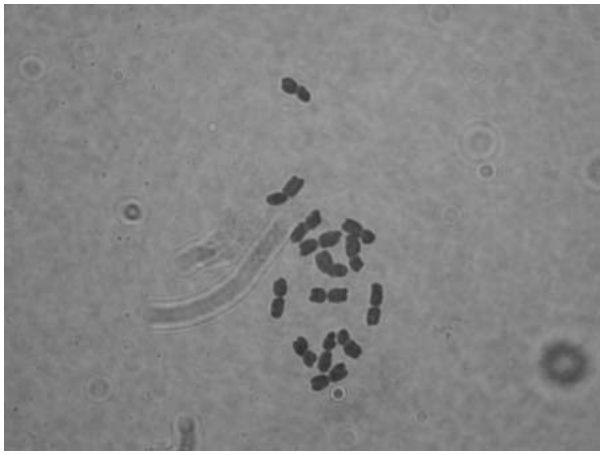

Fig. 3. The metaphase of Dana cultivar

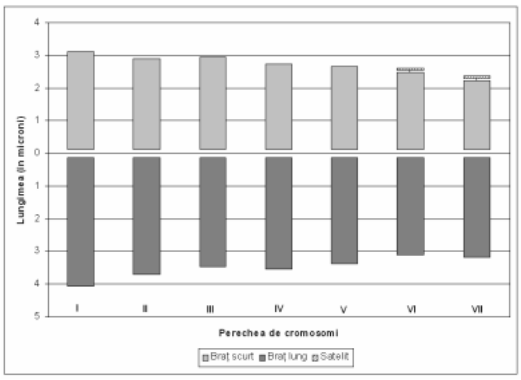

Fig. 4. The idiogramme of Dana cultivar

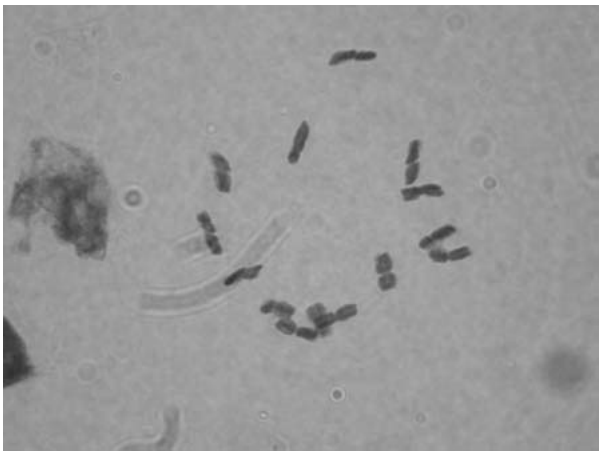

Fig. 5. The metaphase of Mădălin cultivar

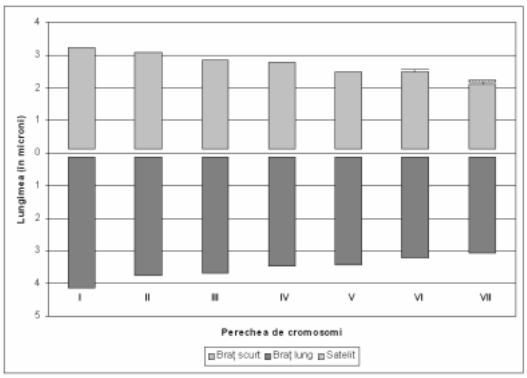

Fig. 6. The idiogramme of Mădălin cultivar

Fig. 7. The metaphase of Miraj cultivar

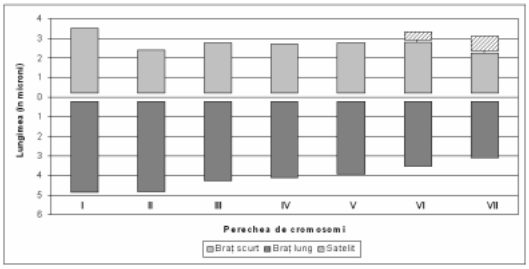

Fig. 8. The idiogramme of Miraj cultivar

The chromosome		Total length (μ)	Variability limits (μ)	Long arm (μ)	Variability limits (μ)	Short arm (μ)	Variability limits (μ)	Arms difference (μ)	Arms ratio	Centromeric index	Relative length	Satellites (μ)
pair	type											
I	m	7.80	6.91-8.91	4.02	3.37-4.89	2.72	2.37-3.14	1.30	1.47	34.87	16.41	
II	m	7.36	6.53-8.70	4.39	3.08-497	2.86	2.20-284	1.53	1.53	38.85	15.49	
III	m	7.11	6.45-8.04	4.01	3.03-3.70	2.92	2.11-2.84	1.09	1.37	41.06	14.96	
IV	m	6.75	6.26-7.49	3.13	2.70-3.41	2.28	1.87-2.70	0.85	1.37	33.77	14.20	
V	m	6.54	6.24-7.13	3.05	2.59-3.31	2.22	1.88-2.64	0.83	1.37	33.94	13.76	
VI	m	6.28	5.39-6.84	2.98	2.54-3.53	2.13	1.84-2.80	0.85	1.39	33.91	13.07	0.11
VII	m	5.67	4.97-6.74	2.76	2.30-3.26	2.01	1.66-2.32	0.75	1.37	35.44	11.93	0.15

Table 1. The chromosomes traits at Adi cultivar

The chromosome		Total length (μ)	Variability limits (μ)	Long arm (μ)	Variability limits (μ)	Short arm (μ)	Variability limits (μ)	Arms difference (μ)	Arms ratio	Centromeric index	Relative length	Satellites (μ)
pair	type											
I	m	7.18	5.87-8.05	3.60	2.65-4.10	2.65	1.90-3.17	0.95	1.35	36.90	16.49	
II	m	6.61	5.33-7.28	3.15	2.35-3.58	2.33	1.83-2.66	0.82	1.35	35.24	15.18	
III	m	6.42	4.76-	2.77	2.18-	2.23	1.83-	0.54	1.24	34.73	14.74	

			6.99		3.35		2.62					
IV	m	6.27	4.66-7.05	2.86	2.37-3.51	2.04	1.65-2.70	0.82	1.40	32.53	14.40	
V	m	6.06	4.49-6.76	2.71	2.00-3.54	2.00	1.57-2.45	0.71	1.35	33.00	13.92	
VI	m	5.60	3.37-6.35	2.66	1.87-2.88	2.06	1.51-2.51	0.60	1.29	36.78	12.86	0.05
VII	m	5.39	3.32-6.08	2.80	1.84-3.30	1.85	1.38-2.03	0.95	1.51	34.32	12.38	0.07

Table 2. The chromosomes traits at Dana cultivar.

The chromosome		The total length (mμ)	Variability limits (μ)	Long arm (μ)	Variability limits (μ)	Short arm (μ)	Variability limits (μ)	Arms difference (μ)	Arms ratio	Centromeri que index	Rela-tive length	Satelli-tes (μ)
pair	type											
m	I	7.37	5.85-10.43	3.44	3.07-4.72	2.53	1.97-3.65	0.91	1.17	34.32	16.84	
m	II	6.84	5.72-9.65	3.11	2.41-4.91	2.45	1.91-3.95	0.66	1.26	35.81	15.63	
m	III	6.52	5.30-9.49	3.08	2.34-4.72	2.24	1.63-3.59	0.84	1.37	34.35	14.89	
m	IV	6.26	5.01-9.14	3.00	2.26-4.37	2.33	1.83-3.57	0.67	1.28	37.22	14.30	
m	V	5.91	4.72-8.12	2.98	2.54-4.78	2.06	1.73-2.86	0.92	1.44	34.85	13.50	
m	VI	5.70	4.70-7.74	2.78	2.22-3.99	2.06	1.93-2.93	0.72	1.33	36.14	13.02	0.01
m	VII	5.16	3.99-6.83	2.68	2.11-4.06	1.72	1.20-2.03	0.96	1.55	33.33	11.79	0.05

Table 3. The chromosomes traits at Mădălin cultivar

The chromosome		The total length (mμ)	Variability limits (μ)	Long arm (μ)	Variability limits (μ)	Short arm (μ)	Variability limits (μ)	Arms difference (μ)	Arms ratio	Centromeri que index	Rela-tive length	Satelli-tes (μ)
pair	type											
I	m	8.35	6.00-12.96	4.00	2.58-6.33	3.23	2.00-5.97	0.77	1.23	38.68	17.45	
II	sm	7.23	5.96-10.08	4.15	2.89-6.79	1.78	1.60-3.16	2.37	2.33	24.61	15.10	
III	m	7.03	5.81-10.00	3.61	2.81-5.52	2.50	1.70-4.14	1.11	1.44	35.56	14.69	
IV	m	6.83	5.45-9.85	3.40	2.65-5.42	2.49	2.10-3.48	0.91	1.36	36.45	14.27	
V	m	6.69	5.44-9.82	3.31	2.58-4.83	2.52	2.00-3.97	0.79	1.31	37.66	13.98	
VI	m	6.36	5.92-9.18	3.15	2.27-4.48	2.99	2.06-4.48	0.16	1.05	47.01	13.29	0.36
VII	m	5.36	4.78-6.00	2.79	2.40-3.60	2.10	1.64-2.44	0.69	1.32	39.17	11.20	0.73

Table 4. The idiogramme of Miraj cultivar