

## COMPORTAREA VARIETĂȚILOR ORNAMENTALE DE *ACER PLATANOIDES* 'GLOBOSUM' ȘI 'CRIMSON KING' ÎN FAZA DE ÎNȚIERE *IN VITRO* *IN VITRO* BEHAVIOUR OF 'GLOBOSUM' AND 'CRIMSON KING' *ACER PLATANOIDES* ORNAMENTAL VARIETIES DURING INITIAL STAGE

Manuela Elena Concioiu<sup>1</sup>, Magdalena Duță<sup>1</sup>,  
Mihaela Ileana Oprea<sup>1</sup> and Alexandru Teodorescu<sup>2</sup>

<sup>1</sup>USAMV Bucharest

<sup>1</sup>University of Pitesti, Faculty of Sciences

### Abstract

Taking into account the economic importance of *Acer* species and their frequent use in landscape architecture, both nationally and internationally, it is necessary to develop an *in vitro* biotechnology research to propagate some of the most popular and requested *Acer* varieties. The study presents data on the partial results of *in vitro* initiation for two varieties of *Acer platanoides*: 'Globosum' and 'Crimson King'. During the initiation phase, *Acer platanoides* 'Globosum' showed the best initiation percentage, using the next nutrient composition: MS macroelements, MS microelements, MS vitamins, auxins/citokinin 0.2:1 mg/l, while *Acer platanoides* 'Crimson King' variety recorded the best results on the nutrient medium with a different composition: MS macroelements, MS microelements, LF vitamins and auxins/citokinin 0.4:1.2 mg/l.

**Keywords:** *Acer platanoides*, *Globosum*, *Acer platanoides*, *Crimson King*, maple, *in vitro* culture, explants

**Cuvinte cheie:** *Acer platanoides*, *Globosum*, *Acer platanoides*, *Crimson King*, arțar, cultură *in vitro*, explante

### 1. Introduction

Varietățile ornamentale 'Globosum' și 'Crimson King' aparțin speciei *Acer platanoides*, fiind ușor de propagat prin semințe, dar cel mai adesea, exemplarele sunt obținute prin altoire sau butășire. Datorită capacității reduse de formare a mugurilor, înmulțirea prin altoire și butășire sunt dificile, din care motiv tehnica micropropagării a luat o amploare deosebită, fiind utilizată pe scară largă la nivel mondial pentru obținerea materialului de înmulțire.

### 2. Material and methods

For the initial phase of *in vitro* culture, explants were taken from shoots harvested in a single phenological moment, the dormant phase (November) respectively, from the stock-plants. Harvesting of shoots was carried out following the protocol requirements of the *in vitro* initiation phase. The two nutrient media V1 and V2, tested for the initiation phase had a different composition, in terms of vitamins and phytohormones (Table 1).

Before sharing the media in culture vessels, the pH was adjusted at 5.6-5.8. Culture media distributed in vessels were sterilized by autoclaving, at 1.1 atmospheres, 120°C, for 25 de min. For the initial stage, the experience had a total of 4 variants, with 3 repetitions each.

Variable factors were:

A - genotype with two graduations, A1 - variety 'Globosum'

A2 - variety 'Crimson King'

B - the nutrient medium, with two graduations, B1 and B2 (Table 2).

The ornamental varieties used were:

- '**Globosum**' - an ornamental tree by 5-6 m height, with globular canopy, round, flatted, with dense and compact branching. Its leaves are initially round, 5 lobed, dull lobes in turn lobate, all peaks acuminate. Leaf color is dark green, becoming golden in autumn (Posedaru, E.A., 2005) (Fig 1.);

- '**Crimson King**' - an ornamental variety with oval canopy, reaches by 15 m in height, with dark purple leaves during summer, very decorative (Fig.1).

Biological material was processed as followed (Fig. 2):

- bending;

- microcutting at 2 - 2.5 cm;

- disinfection by washing with water and 2-3 drops of chlorine based disinfectant, followed by sterilization in 96% ethanol for 10 minutes and 6% calcium hypochlorite for 15 minutes;

- rinse in distilled water sterilized by autoclaving.

Explants, consisting in meristematic tissue with 2-3 leaflets were taken under the binocular in aseptic conditions in laminar air flow hood. The explants were maintained on nutrient media during the initiation phase of *in vitro* culture under laboratory conditions: 24° C ± 2°C temperature, 14 hours photoperiods and 3500 lux light intensity in the growing chamber (Fig. 3.).

### 3. Results and discussions

Results were recorded 15 days after *in vitro* culture initiation (Fig. 4.).

In the initiation phase of *in vitro* culture for the two ornamental maple varieties growth was influenced by two variable factors: nutrient medium composition and genotype.

Following the genotype influence on each nutrient medium we can note that 'Globosum' explants grew faster than 'Crimson King' explants. The best growing percent of explants was obtained on the B1 nutrient medium by 'Globosum' variety with 93.33%, followed by 'Crimson King' with only 53.33% (Fig. 5.).

Following the culture media influence on explants' growth, we can observe that the B2 nutrient medium is not indicated for A1 genotype, explants showing a 66.66% growing percentage, while 'Crimson King' variety on the same nutrient medium presents the greatest value of 86.66% (Fig. 6.).

### 4. Conclusions

We can conclude that the *Acer platanoides* varieties studied, 'Globosum' and 'King Crimson King' had a good behavior during the initiation of *in vitro* culture. The observations and recorded data led to the following conclusions:

'Globosum' variety registered the best growing percentage on the nutrient medium with the next composition: MS macroelements, MS microelements, MS vitamins, auxins/citokinine 0.2:1 mg/l;

'Crimson King' variety recorded the best results on the nutrient medium with a different composition, such as: MS macroelements, MS microelements, LF vitamins and auxins/citokinine 0.4:1.2 mg/l;

This study presents only data obtained during the initiation phase. Because our goal is to establish the *in vitro* propagation biotechnology for these ornamental varieties, we will continue to perform research regarding the vitroplants behavior during the multiplication, rooting and acclimatization phases.

### References

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### Tables and figures

**Table 1. Nutritive media composition tested during the initiation phase**

Composition	V1	V2
Macroelements	MS	MS
Microelements	MS	MS
Vitamins	MS	LF
Agar (g/l)	7	7
Dextrose (g/l)	40	40
NaFeEDTA (mg/l)	32	32
Benzil aminopurină (BAP) (mg/l)	1.0	1.2
Indolil acetic acid (IAA) (mg/l)	0.2	-
Naftil acetic acid (NAA) (mg/l)	-	0.4

Legend: MS = Murashige-Skoog (1962), LF = Lee-Fossard (1977)  
(Lee E.M.C., De Fossard R.A. 1977 and Murashige T., Skoog F. 1962)

**Table 2. Experimental variants for *in vitro* initiation of cultures**

Variants	Variable factors	
	Genotype	Nutritive medium
V1	A1	B1
V2	A1	B2
V3	A2	B1
V4	A2	B2

Figures



Fig 1. *Acer platanoides* 'Globosum' and 'Crimson King' stock plants

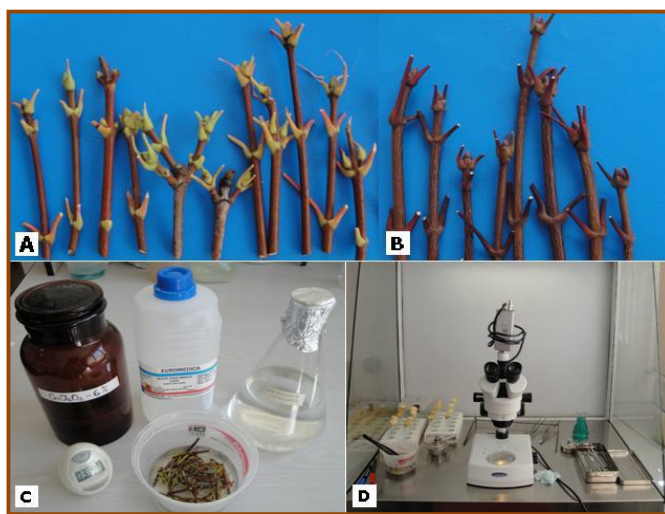


Fig 2. Initiation protocol: A. 'Globosum' cuttings; B. 'Crimson King' cuttings; C. Disinfection; D. Explants' inoculation



Fig. 3. Growth chamber detail



Fig 4. Maple explant two weeks after inoculation

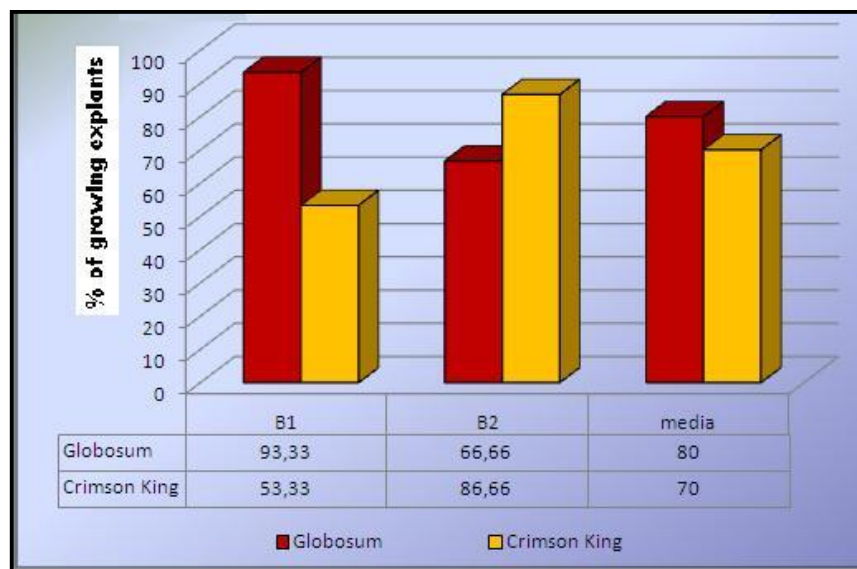


Fig 5. Explants' growth depending on genotype influence

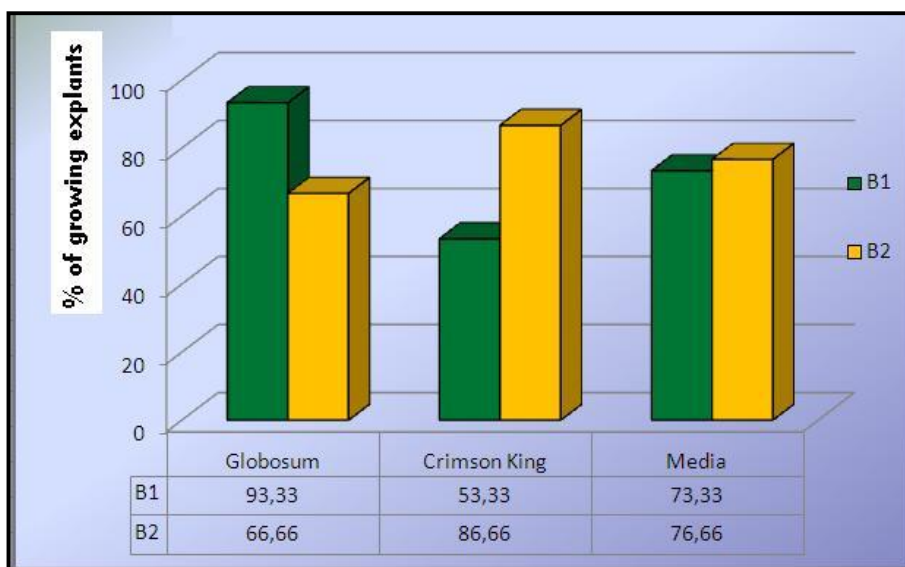


Fig 6. Explants' growing depending on nutrient medium