THE INFLUENCE OF DIFFERENT GROWTH REGULATORS ON *ARAUCARIA EXCELSA* L. VITROCULTURES

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ABSTRACT. *Araucaria excelsa* L. is a well-known conifer, mostly used as an indoor ornamental plant. In this experiment we have studied the reactions of *Araucaria excelsa* minicuttings, in the presence of different growth regulators, added in the aseptic nutritive media. We have prelevated apexes from a previous vitroculture and used them as biological material. The explants were inoculated on BM media, with and without growth regulators. This experiment, which lasted for 90 days, has brought forth the following conclusions: On V_0 (control variant– BM without growth regulators), the inoculs have presented a very weak regenerative capacity; the best medium for *Araucaria excelsa* L. elongation was V_2 (BM with 2 mg/l BA + 2 mg/l NAA); the most ramifications and buds can be obtained if using V_4 experimental variant (BM with 0.5 mg/l NAA + 0.5 mg/l KIN); at any experimental variant the rhysogenesis wasn't observed.

Keywords: *Araucaria excelsa* L., vitroculture, growth regulators, conifer

Abbreviations: MS, Murashige&Skoog (1962); BM, basic medium; BA, benzyl-adenine; IBA, β–indolilbutilic acid; NAA, α-naphtylacetic acid; KIN, kinetin

INTRODUCTION

Araucaria excelsa L. (or Araucaria heterophylla) is a beautiful conifer from Canar and Mader Irelands, and commonly cultured to decorate different indoor and outdoor places (Figure 1). Norfolk Island Pine is one of the relatively few conifers of the southern hemisphere. It's reportedly capable of attaining 70 m in height, but in most tropical areas, seldom exceeds half that. As a landscape tree, it grows ramrod straight with whorled branches arising at right angles to the main trunk. The multiplication of this tree is problematical (Preda, 1979), therefore the "in vitro" micropropagation remains a good alternative to be studied, because of its low production costs and the great number of clones which can be obtained from a very few amount of biological material.

In this experiment we have studied, during 90 days, the influence of combined different growth regulators on Araucaria excelsa vitroplantlets development.

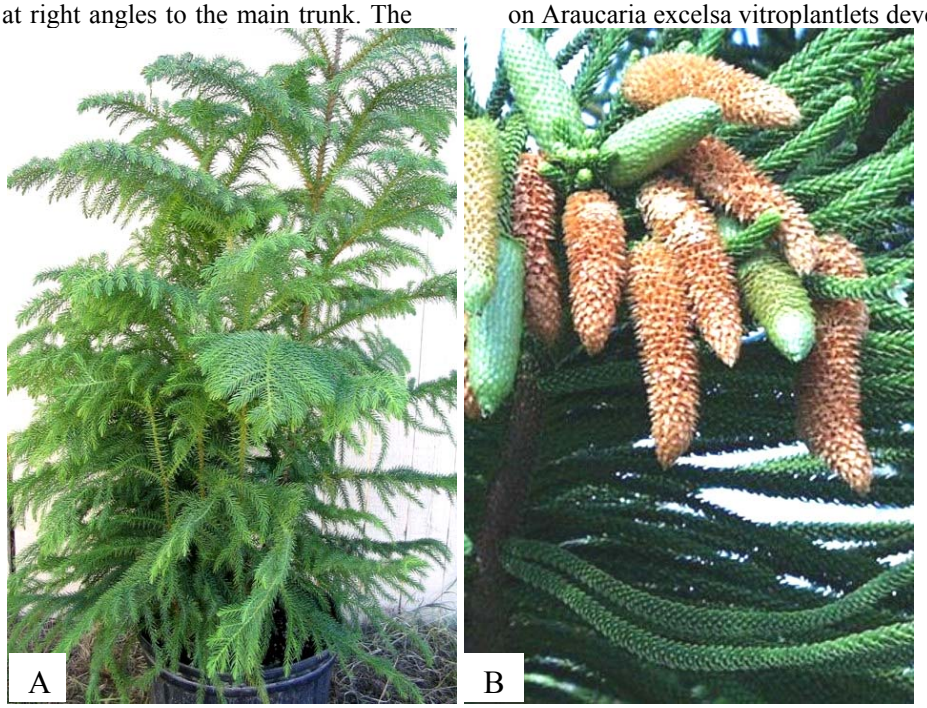

Fig. 1 *Araucaria excelsa* - A-indoor plant; B-cones

MATERIALS AND METHODS

Araucaria excelsa, as we know from the previous vitroculture experiment, has a slow growing rate. For this research we have collected 1 cm length apexes from the Araucaria excelsa L. vitroplantlets.

They were inoculated on 5 different variants of nutritive media. The control experimental variant have consisted in Araucaria excelsa L. apexes, placed on nutritive standard medium, abbreviated here BM (basic medium). The other variants have contained, in addition, different growth regulators,

The Murashige and Skoog (1962) mineral medium, which have consisted in macroelements, FeEDTA, Heller microelements, vitamins (B6, B1 and PP), m-inositol, sucrose and agar, was used as basic medium (BM). In this mixture, growth regulators were added, as following:

- V0 – (control variant) – BM without growth regulators;
- V1 – BM with 2 mg/l BA + 2.5 mg/l IBA;
- V2 – BM with 2 mg/l BA + 2 mg/l NAA;
- V3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA;
- V4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN;

The growth media were sterilized at 121°C, during 30 minutes (Cachiţă, 2000). After their cooling, in the sterile room, we proceeded to inoculate the minicuttings, one piece per culture recipient, and place them on shelves, at 20-22°C, under fluorescent white light, at 1700 lux, with a 16h light/24h photoperiod.

RESULTS AND DISCUSSIONS:

The *Araucaria excelsa* L. vitroplantlets evolution has been observed during 90 days of experiment, and the watched parameter were noted and compared.

At 30 days after inoculation, the *Araucaria excelsa* L. vitroplantlets have presented a low activity, a very small elongation, their height modification being mostly insignificant (Figures 2 and 3). The highest elongation was founded on V_2 medium (BM with 2 mg/l BA + 2 mg/l NAA). No buds were observed on control variant, but they began to appear at the others. The rhysogenesis was totally missing.

At 60 days after inoculation, the best elongation was observed also on V_2 medium (BM with 2 mg/l BA + 2 mg/l NAA) (fig.5, fig.6), but the ramifications were more on V_4 medium (BM with 0.5 mg/l NAA + 0.5 mg/l KIN), (Figures 4 and 5). The buds were well defined and could be counted (Figure 6).

The 90th day of this experiment has revealed us that in the V_2 medium (BM with 2 mg/l BA + 2 mg/l NAA) the vitroplantlets were 25% taller than those from the control variant (BM without growth regulators) (Figures 7 and 8). The most ramifications were found again at V_4 experimental variant (BM with 0.5 mg/l NAA + 0.5 mg/l KIN) (Figures 7 and 8)

The control experimental variant V_0 (BM without growth regulators) still hasn't manifested any ramification (Figures 7 and 8). The most ramifications were found on V_4 (BM with 0.5 mg/l NAA + 0.5 mg/l KIN) (Figure 9)

No one of experimental variants has manifested rhysogenesis during the 90 days of experiment.

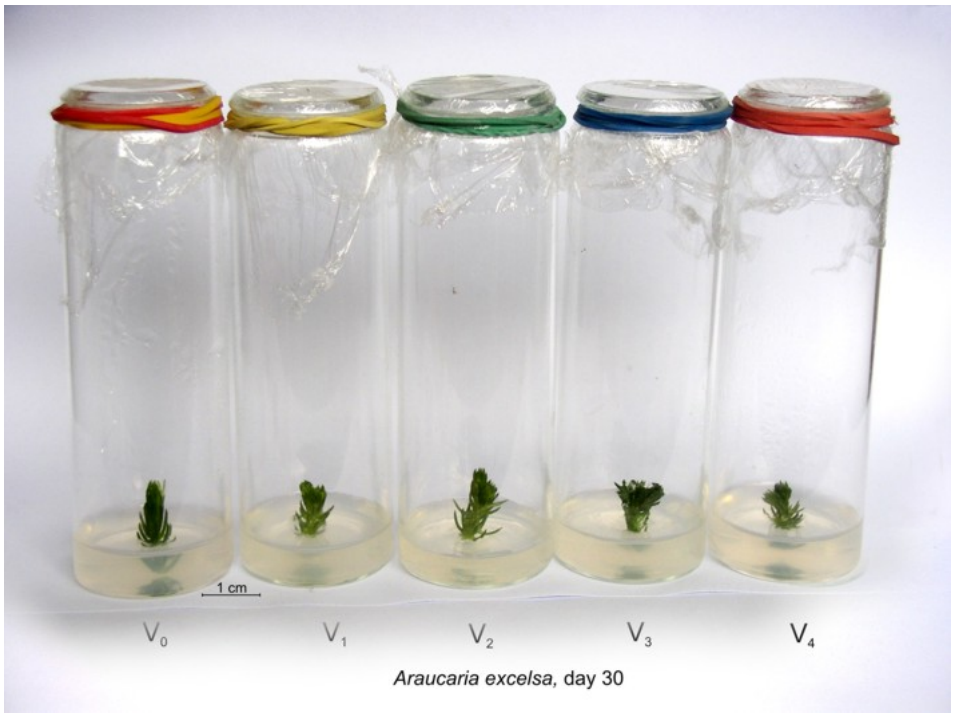

Fig. 2 *Araucaria excelsa* at 30 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

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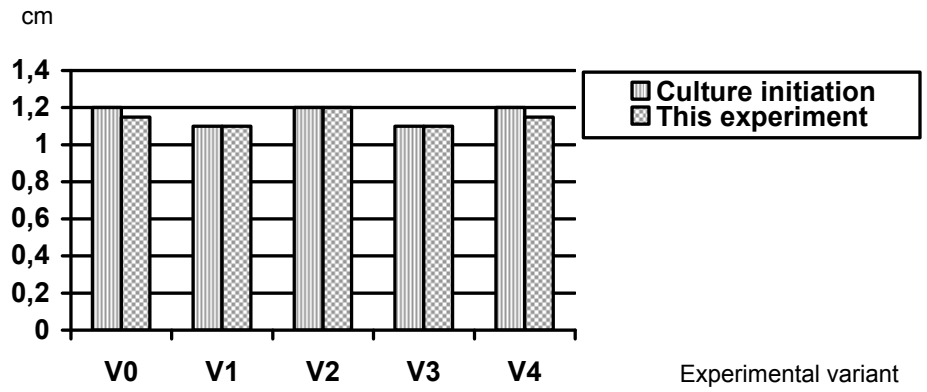

Fig.3 *Araucaria excelsa* elongation at 30 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

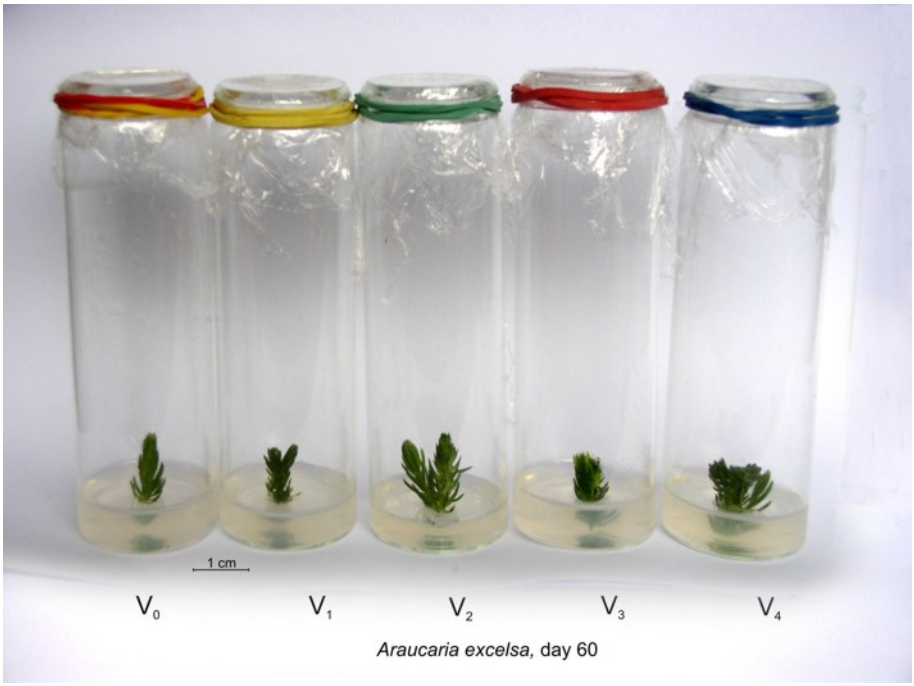

Fig. 4 *Araucaria excelsa* at 60 days after inoculation**.** V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

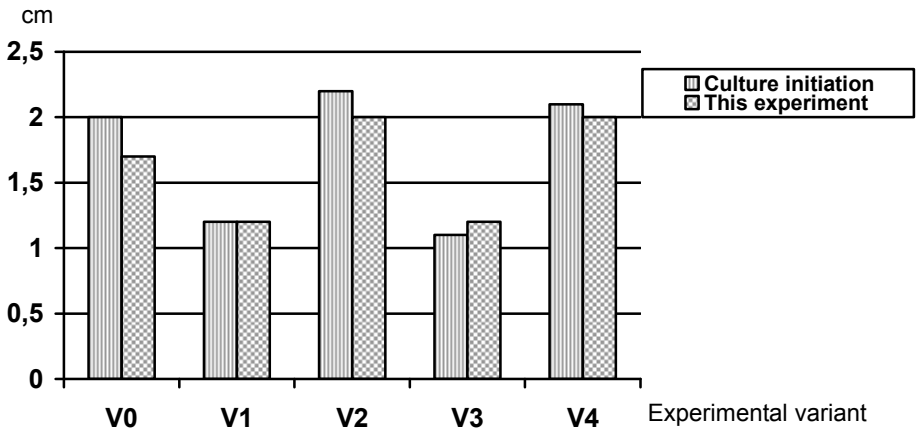

Fig. 5 *Araucaria excelsa* elongation at 60 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

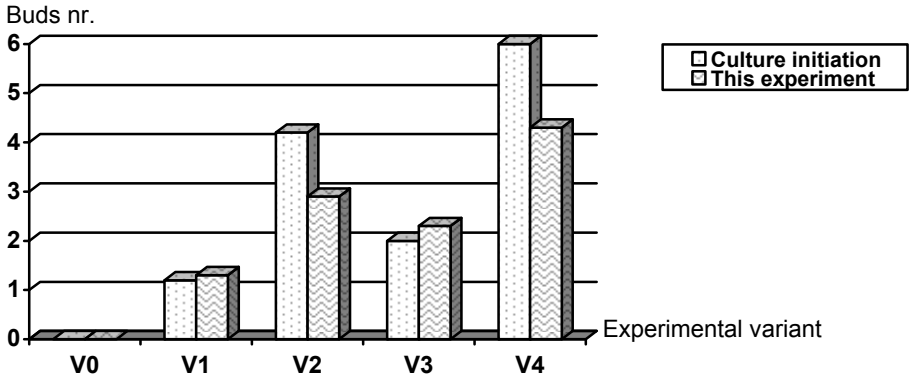

Fig. 6 *Araucaria excelsa* bud number (average) at 60 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

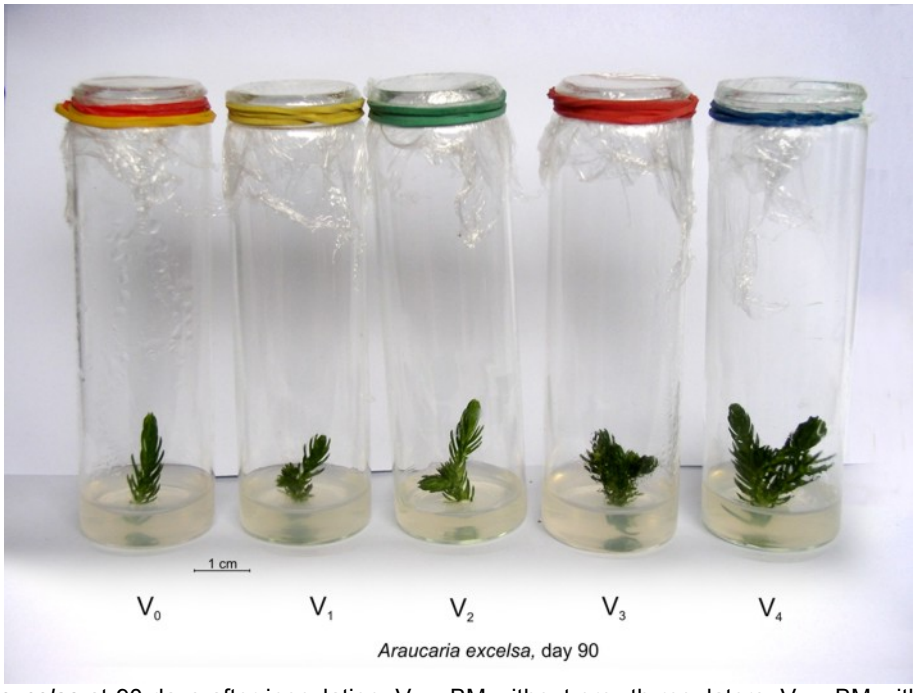

Fig. 7 *Araucaria excelsa* at 90 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN;

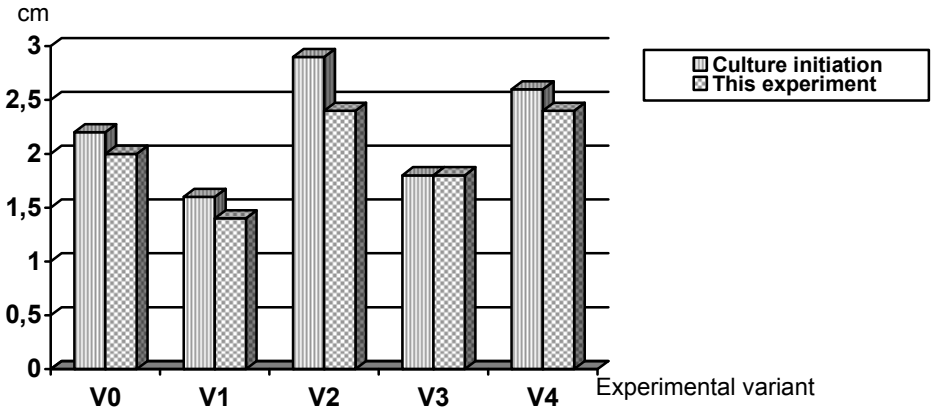

Fig. 8 *Araucaria excelsa* elongation at 90 days after inoculation**.** V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

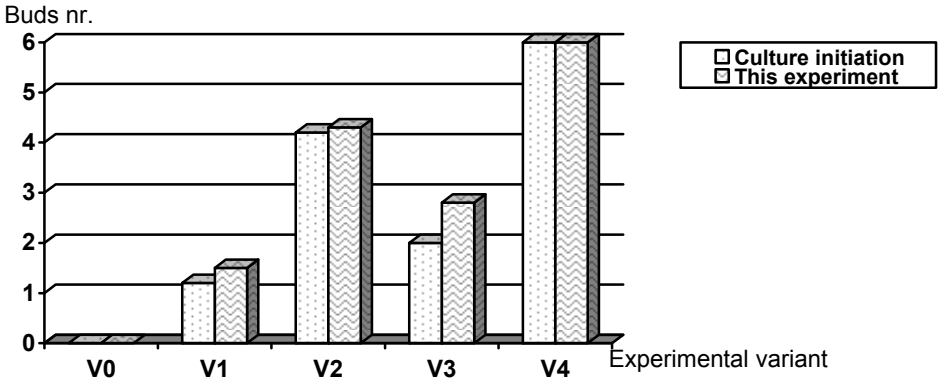

Fig. 9 *Araucaria excelsa* bud number (average) at 90 days after inoculation. V_0 – BM without growth regulators; V_1 – BM with 2 mg/l BA + 2.5 mg/l IBA; V_2 – BM with 2 mg/l BA + 2 mg/l NAA; V_3 – BM with 0.5 mg/l KIN + 2.5 mg/l IBA; V_4 – BM with 0.5 mg/l NAA + 0.5 mg/l KIN

CONCLUSIONS:

On V_0 (control variant – BM without growth regulators), the inoculs have shown a very weak regenerative capacity.

No ramifications were observed on standard MS medium (V_0).

The best media for elongation of *Araucaria excelsa* L. were V_2 (BM with 2 mg/l BA + 2 mg/l NAA) and V_4 (BM with 0.5 mg/l NAA + 0.5 mg/l KIN).

The most ramifications and buds can be obtained if using V_4 experimental variant medium (BM with 0.5 mg/l NAA + 0.5 mg/l KIN).

The culture medium used in V_4 experimental variant, (BM with 0.5 mg/l NAA + 0.5 mg/l KIN), is the best, among tested nutritive media, for *Araucaria excelsa* rejuvenation and micropropagation.

90 days seems to be a to short vitroculture period, for rhysogenesis occurrence.

No significant differences between culture initiation and this experiment were observed.

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