CONTRIBUTIONS OF THE INFLUENCE OF TREATMENT GROWTH REGULATORS ON ROOTING OF THE AZALEEA INDICA

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Abstract

More sensitive than Mimosa pudica and more beautiful than any adornment detached from nature by man, the azalea (Azaleea indica) gathers through its shapes a real symphony of colours and enchanting hues, of elegant shapes, having no rival in the flower world.

The azalea can multiply through seeds and vegetatively: seedlings, grafting, layering.

The widest reproduction method remains that through semilignified seedlings, a method that can be used throughout the year avoiding the months less favourable for propagation by seedlings, with poor light: November and October. The best results are given by the spring propagations by seedlings (February-March) and the summer propagations by seedlings (July-August). The rooting can last for 12-14 weeks until the seedlings can be transplanted in flower pots without risks.

A wide application in horticultural practice is the use of growth substances, that take part in the faster formation of roots and in a higher percent for species of plants, that, normally, root with difficulty through seedlings. Under this aspect, many synthetical compounds have proved to be very active (NAA, IAA, IBA, 2,4,5-T acid etc.) (Milica and all., 1983).

Key words: IAA, IBA, NAA, growt regulators, seedlings, rooting, growth substances

INTRODUCTION

The ornamental ligneous species can multiply vegetatively through propagation by seedlings, grafting, layering, separation of the bush, propagation by basal shoots. The most often used reproduction method in the case of most species is by seedlings, the material used for this type of reproduction being the seedlings, meaning those portions of the plant that, placed in favourable vegetation conditions according to the principle of restitution, restore organisms that are identical with those of which they were harvested (*Adams, 1987*, *Bandici, 2012, 2013)*.

The rooting medium that gave best results was sand from which the coarse and the fine factions were removed. Transplants about 4–12 months old were used as ortets, some of them repeatedly (*Flake and all., 1978*). Single node cuttings with part of one leaf were tested. In early experiments “first top node” cuttings were much poorer than cuttings which included second or third nodes from the apex, it was too early to conclude how

cuttings from lower down on the ortet would perform (*Hare, 1984*). There was some indication that better rooting occurred in cuttings from younger than older ortets (*Halls, Lowell, 1977, Ross and all., 1983, Taiz, Zeiger, 2002)*.

No clear trend resulted from tests of shading cuttings, though it seemed to promote rooting in younger "first top node" cuttings. Hormone treatment with NAA, IAA, and IBA suspended in talc seemed to have a negative effect, while IBA trended to promote rooting of "2nd top node" cuttings. In trials to date water stress seems to lower rooting percentages. Excessive reduction of the leaf left on the cutting appeares to have the same effect *(DeYoe, Zaerr, 1976, Gill-Albert, Boix, 1978, Litle and Pharis, 1995, Bandici, Vlad, 2000*).

Survival after potting of rooted cuttings ranged from 10 to 50% in spite of the several weaning periods and transplanting methods tried. The reason for this, the most important problem encountered, is not known. This transplanting phase is the highest priority for future work (*Piney, 1970, Ormsbee and all., 1976, Peterson and all., 1979*).

MATERIALS AND METHODS

For the examination of the influence of some biostimulators of the type NAA, IAA and IBA on the rooting percent of the seedlings, on the diameter of the root bale, on the number of roots and on the length of the roots for the species *Azaleea indica*, an experiment was organized in period 2012-2013, at the University of Oradea, Environmental Faculty, Romania.

The species that were used were chosen taking into account the tendency of the cultivators to spread them more than the others due to their decorative value, to the possibility to multiply by seedlings or by grafting, their resistance to different attacks of diseases and pests: Apollo, Madame John Häerens, Reinold Ambrosius, Memoire August Häerens.

For the choice of the substances used as stimulators, of the concentrations and the duration of treatment, as starting points were taken the recommendations found in the specialty literature, so that the studied variants were:

V_1 = untreated witness (Mt);
V_2 = NAA 500 ppm, treatment time 60 seconds;
V_3 = NAA 1000 ppm, treatment time 60 seconds;
V_4 = NAA 1500 ppm, treatment time 60 seconds;
V_5 = IAA 500 ppm, treatment time 60 seconds;
V_6 = IAA 1000 ppm, treatment time 60 seconds;
V_7 = IAA 1500 ppm, treatment time 60 seconds;
V_8 = IBA 1000 ppm, treatment time 60 seconds;
V_9 = IBA 1500 ppm, treatment time 60 seconds;

The solutions NAA, IAA and IBA, have been prepared in the morning of the treatment of the seedlings so that they should not reduce or change their influence. After weighting, they were dissolved one at a time in alcohol of 96^0.

The variants were placed straight, with separation strips between them to prevent mutual influence, 50 plants of each species were planted, considering 12 seedlings in a repetition.

The results were statistically processed using the method of the " *analyses of variance (ANOVAs*)". Two proportion tests were used to determine significant differences in percentage analyses.

RESULTS AND DISCUSSIONS

The calculations were carried out only for the species azalea Apollo because there are no significant differences among the species. By analysis the data in table 1, we notice that the moment of the appearance of the calus is not the same for all variants, being recorded gaps of 10-13 days. The appearance of the calus was recorded the fastest for variants V_2 and V_7.

Tabel 1

The influence of the investigated factors on some phonological determinations for the species Azalea race Apollo, Oradea 2012- 2013

Var	Applied treatement/ concentration	Date of propa-gation by seedlings	Date of the appearance of the calus	Date of the app. of roots	Date of the compl. rooting	Date of planting in the flower pot	Days necessary for rooting
V_1	Untreated witness (Mt)	21.03	23.04	01.05	17.05	20.05	67
V_2	NAA 500 ppm,	21.03	15.04	22.04.	30.04	20.05	40
V_3	NAA 1000 ppm	21.03	20.04	28.04	06.05	20.05	46
V_4	NAA 1500 ppm	21.03	20.04	28.04	07.05	20.05	47
V_5	IAA 500 ppm	21.03	23.04	01.05	13. 05	20.05	63
V_6	IAA 1000 ppm	21.03	23.04	02.05	15. 05	20.05	65
V_7	IAA 1500 ppm	21.03	10.04	17.05	28.04	20.05	38
V_8	IBA1000 ppm	21.03	23.04	01.05	13.05	20.05	63
V_9	IBA1500 ppm	21.03	23.04	02.05	18.05	20.05	68

The appearance of the first roots was recorded the latest for V_2, weaker than witness V_1, and the earliest for V_4. The faster appearance of the roots after calusare favours faster complete rooting by reducing the time necessary for rooting. For the variants treated with IAA 1500 ppm (V_7) and with NAA 1500 ppm (V_4), the rooting time was shortened a lot.

If the witnessV_1 needed 67 days, the variants V_2 and V_7, needed approximately 6 weeks, the rooting time shortening significantly (3 weeks). For these variants we can observe the appearance of the calus, the appearance of the first roots and complete rooting in a reduced number of days. The species of azalea behave differently at rooting, a situation that is illustrated in practice. The species Madame John Häerens presents the

highest percent of rooting of all variants. The use of growth stimulators offers the possibility for these species to multiply constantly through propagation by seedlings, good results being obtained with IAA 1500 ppm (V_7) with 92 %.

The length and diameter of the root bale are indexes that, through the reached value mark the moment of planting in the flower pot of the rooted seedlings. The seedlings can be planted when the diameter of the root bale reaches 1,5-2 cm.

In order of the value of the performed morphological determinations, the best and worst results, according to species, are presented in table 2. The data refer only to the diameter of the root bale, their length being in close and positive correlation with the diameter.

Table 2

The situation of the diameter of the root bale for different races of Azaleea, Oradea 2012-2013

Races	Good results (cm)	Bad results (cm)
August Häerens	V_7 – IAA 1500 ppm = 2.69 V_2 – NAA 500 ppm = 2.31	V_5 – IAA 500 ppm = 0.75
Apollo	V_7 – IAA 1500 ppm = 2.80 V_2 – NAA 500 ppm = 2.77	V_9 – IBA 1500 ppm=0.78 V_6 – IAA 1000 ppm ==0.89
Reinhold Ambrosius	V_7 – IAA 1500 ppm = 1.00	V_6 – IAA 1000 ppm ==0.62 V_5 – IAA 500 ppm = 0.66
Madame John Häerens	V_4 – IAA 1500 ppm = 2.14	V_8 – IBA 1000 ppm = 0.86 V_5 – IAA 500 ppm = 0.75

After the statistical calculation performed only on the data referring to the diameter and length of the roots (tables 3 and 4), we notive the fact that the rooting stimulators used for azalea have a positive effect both regarding the rooting time and the sizes of the roots, being statistically secured – very significant the variants: NAA 500 ppm (V_2); NAA 1000 ppm (V_3), NAA 1500 ppm (V_4) and IAA 1000 ppm (V_7).

Also as very significant in the sense of weak rooting were noticed the variants that were treated with: IAA 1000 ppm (V_6) and IBA 1500 ppm (V_9). No significance was recorded for the variants: IAA 500 ppm (V_5) and IBA 1000 ppm (V_8). For the fulfilment of the profitability of the azaleea culture the use of stimulants is compulsory.

Table 3

The synthesis of the results regarding the diameter of the roots Oradea 2012-2013

Variant/tratament/conc. (ppm)	Average diameter of the root bale (cm)	% over the witness	Signification
Untreated witness (Mt)	1.21	100	-
NAA 500 ppm,	2.59	213	xxx
NAA 1000 ppm	0.13	176	xxx
NAA 1500 ppm	2.16	178	xxx
IAA 500 ppm	1.01	84	-
IAA 1000 ppm	0.63	52	000
IAA 1500 ppm	2.93	242	xxx
IBA1000 ppm	1.32	109	-
IBA1500 ppm	0.60	49	000
LSD 5% LSD 1% LSD 0.1%	0.28 0.38 0.51		

Note: NS = Non-significant = under 0.28; * = Significant = 0.28 – 0.38; ** = Significantly different = 0.38-0.51; *** = very significant = over 0.51

Table 4

The synthesis of the results regarding the length of the roots Oradea 2012-2013

Variant/tratament/conc. (ppm)	Average length of the roots (cm)	% over the witness	Signification
Untreated witness (Mt)	0.80	100	-
NAA 500 ppm,	1.67	208	xxx
NAA 1000 ppm	1.21	161	xxx
NAA 1500 ppm	1.46	182	xxx
IAA 500 ppm	0.69	86	-
IAA 1000 ppm	0.47	58	000
IAA 1500 ppm	1.94	212	xxx
IBA1000 ppm	1.02	127	x
IBA1500 ppm	0.53	66	00
LSD 5% LSD 1% LSD 0,1%	0.20 0.27 0.36		

Note: NS = Non-significant = under 0.20; * = Significant = 0.20 – 0.27; ** = Significantly different = 0.27-0.36 ; *** = very significant = over 0.36

CONCLUSIONS

Through the use of stimulents, the time necessary for rooting is reduced from 9-11 weeks to 5-6 weeks for azalea seedlings;

The reduction of the time necessary for rooting removes the exhaustion of the seedlings, determining at the same time a better evolution of the plants in flower pots;

For more complete information on the influence of the stimulants on the rooting of azalea plants, we recommend the continuation of the observations on the plants rooted with stimulants also after the planting in the flower pot, following their behaviour and evolution until blooming.

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