

Role Of Growth Hormones In Grape Sapling Production

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ABSTRACT: The objective of study was to study the most appropriate concentrations of hormonal stimulants for rooting grafts and their effects on addition of rooting. The trial was carried out in sampling yards of Pezë areas, Tirana District, in medium alluvial soils, rich to nutritious matters. The experiment was designed in four variants. Control group were represented by V_1 and group of experiment was represented by V_2, V_3, V_4 . The grafts, after cleaning their bottom parts, were inserted in solutions prepared according to the rate of concentrations and they were immediately planted. During the treatment, the temperature of environment was 17to18°C. The trial was carried out for cultivars "Shesh i Zi" with rootstocks Koober 5bb. Grafts callused and treated with heteroauxine, were maintained in shady places until planting. Hormonal stimulant, acetic B indolil acid was dissolved in alcohol (5-10 mg acetic B indolil acid was dissolved in 0.5 liter alcohol). This solution was maintained in glass container in dark and cool environment. Before using the solution was diluted with water in glass container according to certain concentrations. Results: rootstocks "Rupestris dy lot x Sheshi zi" and "41 B x Sheshi i zi, treated with acetic B indolil acid of 500 and 1000 ppm concentration had higher percentage of increasing (54 and 56 %), compared to V_1 (without stimulant), whereas as for V_2 (250 ppm concentration), the increase of production of first class saplings for grafts "Rupestris dy lot x Sheshi i zi" is negligible (25-25.6%). Negligible results were also obtained from the callused grafts "41 B x Sheshi i zi". The influence in rooting was lower than in 500 and 1000 ppm concentration (13.3 to 15.3%). Grafts "Kober x Shesh i zi" callused and treated with acetic B indolil acid of 250 ppm concentration had a increase almost equal to 500 ppm concentration. But also in this rootstocks, increase of production was higher than 1000 ppm concentration. Conclusion: Use of hormonal stimulant acetic indolil acid improves quantitative indicators of grape saplings callused and rooted.

Key words: callusing, heteroauxine, ABIA, acetic indolil, cell, gamotic auxin, pectin

1. INTRODUCTION

Scientists have conducted a lot of trials to study role and effects of hormones in increasing the rate of rooting grafts. One of heteroauxins used is acid "B" indolil acetic separated from the urine of animals or so called "ABIA". Theoretical investigations that explain role of growth stimulants are since of ancient times. But before XIX-th century, effects of growth stimulants are confused with changes occurred in plant organism due to water penetration or gamotic exchanges. But if Saksi(1873) explained that changes occurred in plants' organs are in their own nature, it was his descendants that explained the cause of growth phenomenon and role of phyto-hormones. Auxines act on cell membrane modifying physical and chemical properties. They firstly act on cytoplasm of the cell. In 1930-'40, researchers reached to a conclusion that adding of ABIA in plants led to the increase of growth rate of plants. The increase of cell size is direct action of auxine. The increase of cell size is accompanied with the changes of physical and chemical properties of membrane, by means of increasing component materials of membranes. Researchers reached to conclusion that auxines act not only in the process of increasing cell size but also in their division. According to literature, the auxine increases the plasticity of cell walls, incites cell division of meristematic tissue stimulating the development of roots' callus. Recognizing effects of using stimulants for the improvement of rooting, recently, in all countries dealing with the production of grape seedlings, farmers are very interested for using them. In Balkan Peninsula Countries, like Bulgaria, about 80 % of callused grafts are treated with stimulants.

2. MATERIALS AND METHODS

The trial was carried out in sampling yard of Pezë area, in medium alluvial soils, rich to nutritious matters. The experiment was designed in four variants. V_1 was served as control group and experiment one was represented by $V_2,$

V_3, V_4 . The trial aimed to identify the most appropriate concentrations for using stimulants for rooting grafts arched and callused seeing at the same time the effect of increase of rooting.

Table 1
ABIA stimulant concentration

Variants	ABIA stimulant concentration (ppm)
V_1	0
V_2	250
V_3	500
V_4	1000

The grafts, after cleaning their bottom parts, were inserted in solutions prepared according to the rate of concentrations and they were immediately planted. During the treatment, the temperature of environment was 17to18°C. The trial was carried out for cultivars "Shesh i Zi" with rootstocks Koober 5bb. Grafts callused and treated with heteroauxine, were maintained in shady places until planting.

2.1 Ways of using

Hormonal stimulant, acetic B indolil acid was dissolved in alcohol (5-10mg acetic B indolil acid was dissolved in 0.5 liter alcohol). This solution was maintained in glass container in dark and cool environment. Before using the solution was diluted with water in glass container according to certain concentrations

3. RESULTS AND DISCUSSION

Tables show indicators reached to different concentrations of acid B indolil acetic in rooting grafts cullosed, expressed in percentage versus 100 plants per each variant

Table 2
Variant (V₁) without stimulant

Item	2001	2002	2003	Mean
First class sapling	28	28	36	30,6
Number of roots with dimension 1,5mm	6	4	4	4,6
Length of mature shoots(cm)	34	73	32	46

Table 3
Variant (V₂). Concentration of stimulant: 250 ppm.

Item	2001	2002	2003	Mean
First class sapling (% to planting)	35	43	43	40,3
Number of roots with thickness over 1.5 mm	7	5	4,5	5,5
Length of mature shoots(cm)	33	70	21	41

Table 4
Variant (V₃). Concentration of stimulant: 500 p.p.m.

Item	2001	2002	2003	Mean
First class sapling (% to planting)	47	41	45	44
Number of roots with thickness over 1.5 mm	10	6	5,3	7,1
Length of mature shoots(cm)	34	68	34	45

Table 7.
Effects of stimulant according to years

Variant	years	saplings planted	First class saplings planted		Number of roots with thickness over 1.5 mm	% to V ₁	Length of mature shoots (cm)
			Total	%			
V ₁ (0)	2001	600	168	28	6	100	34
	2002	600	168	28	4	100	73
	2003	600	216	36	4	100	32
	Mean.	600	184	30,6	4,6	100	46
V ₂ (250 ppm)	2001	600	210	35	7	116	33
	2002	600	258	43	5	125	70
	2003	600	258	43	4,5	112	21
	Mean.	600	242	40,3	5,5	119	41
V ₃ (500 ppm)	2001	600	282	47	10	166	34
	2002	600	246	41	6	150	68
	2003	600	270	45	5,3	132	34
	Mean.	600	266	44	7,1	154	45
V ₄ (1000ppm)	2001	600	246	41	13	216	34
	2002	600	252	42	5	125	68
	2003	600	276	46	4,7	102	34
	Mes.	600	248	43	7,6	165	45

In V₁, about 40% of shoots were developed, while in variants treated with stimulants the rate of sprouting ranged from 60 to 80 %. It is explained by the fact that first 20 to 30 days of planting, the newly hatched shoots use substances deposited in rootstocks and the rooting system, which is being formed, is not yet able to absorb water and mineral substances from soil. Number of roots of dimension on 1.5mm had good growth and in some variants had branching of them. Rate of increase (in %) for V₂, V₃ and V₄ towards V₁ are shown as follows:

Variants	3 –year mean
V ₂ 250 p.p.m.	119 %
V ₃ 500 p.p.m.	154 %
V ₄ 1000 p.p.m.	165 %

Increase of roots' number affected on strengthening of moving up knot of graft and accelerating maturity of shoots by about 10 days earlier than V₁, leading to increase of yield in saplings arched and rooted. Use of stimulants also influenced in uniform distribution of roots around last knot. All these accelerated the withdrawal of nutrients from the absorbing complex of soil, strengthening of jointing

between two components in grafting and as a consequence, newly hatched shoots come out from on graft be grown under good conditions. The data of table 3 show that the production of samplings in third years (2003) increased by 28 to 36 % in V_1 (without treating with stimulant). Approximate results in the increase of production have been obtained from a lot of farmers, where the main additional factor that have positively affected on this indicator is the temperation of samplings for a period of two weeks before planting. Effect of hormonal stimulant in

the technology of planting saplings grafted and callused in bilona covered with black polietilen was tested in third year of experiment. In this case, the increase of production of grape saplings grafted and callused was about 6 %. Especially, use of heteroauxine, acetic indolil acid had also a greater influence on production of saplings grafted with rootstocks 41B, which had weaker rooting. Veçanërisht ndikim më të ndjeshëm ka dhe përdorimi i heteroauksinës, acidi indolil acetic në fidanat e shartuar me nënshartesën 41 B e cila ka patur dhe rrënjëzim më të dobët.

Table 8
Final results of hormonal stimulant influence in rooting three rootstocks

Item	V_1 0	V_2 250 ppm	V_3 500 ppm	V_4 1000 ppm	Increase in %
I. Koober 5 bb x Shesh i zi					
First class sapling	36	43	45	46	22
Length of mature shoots(cm)	32	31	34	34	0
Number of roots	3	3.1	5.3	4.7	
II. Dy lot x Shesh i zi					
First class sapling	25	25.6	36	44	56
Length of mature shoots(cm)	32.6	31	32	31	
Number of roots	4.1	5.5	6.9	6.3	
III. 41 B x sheshi i zi					
First class sapling	13.3	15.3	22	24	54
Length of mature shoots(cm)	32.6	31	31.6	20	
Number of roots	3.5	4.5	4.5	4.8	

According to the data given in Table 3, rootstocks "Rupestris dy lot x Sheshi zi" and "41 B x Sheshi i zi, treated with acetic B indolil acid of 500 and 1000 ppm concentration had higher percentage of increasing (54 and 56 %), compared to V_1 (without stimulant), whereas as for V_2 (250 ppm concentration), the increase of production of first class saplings for grafts "Rupestris dy lot x Sheshi i zi" is negligible (25-25.6%). Negligible results were also obtained from the callused grafts "41 B x Sheshi i zi". The influence in rooting was lower than in 500 and 1000 ppm concentration (13.3 to 15.3%). Grafts "Kober x Shesh i zi" callused and treated with acetic B indol acid of 250 ppm concentration had a increase almost equal to 500 ppm concentration. But also in this rootstocks, increase of production was higher than 1000 ppm concentration. This is a fact to reach to similar conclusions for two other rootstocks

4. CONCLUSIONS

Use of hormonal stimulant acetic indolil acid improves quantitative indicators of grape saplings callused and rooted. The highest yield and the most qualitative indicators are obtained by using stimulant of concentrations 500 and 1000 ppm

4.1 References

- [1] Bordein T. Bodi I. Lukturari stitinfikë Volumi V 1961-1962
- [2] Branas J. Viticulture
- [3] Galet P. Precis de viticulture 1976
- [4] Gjermani T. Formimi i kallusit në hardhinë e shartuar. Buj. socialiste nr.11 viti 1982
- [5] Gjermani T. Përdorimi i parafinës në shartimin e hardhive antifillokserike. Buletini i shkencave Bujqësore nr.4 1978
- [6] Gjoka S. Efekti i përdorimit të stimulantëve në rrënjëzimin e hardhisë. Pemptaria 1970
- [7] Maltabar M.L. Proisvostvo privitih vinogradnik saxhenev 71
- [8] Merja A. Teknologjia e re në fidanishten e hardhisë. Bujq. Socialiste Nr.10, 1982
- [9] Pilot F. Les Phytohormones de croiscence 1961
- [10] Roland V. Sivano S. Copltivacioni arbore viti 1981
- [11] Sotiri P. Nini T. Gjermani T. Vitikultura 1973
- [12] Sotiri P. Vitikultura në Shqipëri. Bul. Shk. Bujqësore Nr.2
- [13] Dervishi. B. Monografi "Vreshtaria e Sheshit". Botim i vitit 2003.
- [14] Dervishi. B. Format e Krasitjes cv. Shesh i Zi dhe Shesh i Bardhe. Sh. Bujqësore. 2003.
- [15] Dervishi. B. Libër, Vreshtaria për fermerin. Viti 2004.
- [16] Dervishi. B. Karakteristikat agro-biol. ampelografike të Cv Sheshi i Zi, BSH U.B Nr 1, Tiranë.