

# RESULTS CONCERNING THE GROWTH AND THE DEVELOPMENT OF THE TOMATOES GRAFTED SEEDLINGS

## REZULTATE PRIVIND CREȘTEREA ȘI DEZVOLTAREA RĂSADURILOR ALTOITE DE TOMATE

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**Abstract.** *The research was realized in the Laboratory of Protected Crops of the ICDIMPH-Horting Bucharest, during the years 2008-2009. Were watched the growth and the development of the tomatoes grafted seedlings. The biological material used was composed from grafted seedlings, using two scions, tomatoes F<sub>1</sub> hybrids (Alambra and Cypriana) and rootstocks of Lycopersicon genus (Beaufort, Titron, Suketto and Konkurabe). The rootstocks have induced force at root and aerial part to grafted plants. Beaufort rootstock has obtained the best results, followed by Titron, then Suketto and Konkurabe. From registration of the growth and development indicators has resulted a superior quality of the grafted planting material, compared with the normal seedlings.*

**Key words:** *vegetable growing, planting material, quality indicators*

**Rezumat.** *Cercetarea s-a realizat în Laboratorul de Culturi Protejate al ICDIMPH-Horting București, pe parcursul anilor 2008-2009. S-au urmărit creșterea și răsadurilor de tomate altoite. Materialul biologic folosit a fost alcătuit din răsaduri altoite, folosind ca altoi doi hibrizi F<sub>1</sub> de tomate (Alambra și Cypriana) și portaltoi din genul Lycopersicon (Beaufort, Titron, Suketto și Konkurabe). Portaltoii au imprimat plantelor altoite vigoare la nivel radicular și la partea aeriana. Portaltoiul Beaufort a obținut rezultatele cele mai bune, urmat de Titron, apoi Suketto și Konkurabe. Din înregistrarea indicatorilor de creștere și dezvoltare a rezultat o calitate superioară la materialul săditor altoit, comparativ cu răsadurile nealtoite.*

**Cuvinte cheie:** *legumicultură, material săditor, indicatori de calitate*

## INTRODUCTION

Grafting the vegetables seedlings (solanaceous, cucurbits) is experienced in ICDIMPH-Horting from 2005 year.

The grafted tomatoes seedlings compared with normal seedlings have superior growth and development, are a valuable planting material, give quality of the crops and increased production. Also, the grafted plants are resistant to diseases (*Fusarium* spp., *Verticillium* spp.) and pests (nematodes) transmitted through the ground (Bogoescu et al., 2008).

The production technology of the grafted tomatoes has opened the prospect of a production in accordance with the standards required by the European

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market. The quality of the seedlings is critical to ensuring economic efficiency and environmental protection (Dobrin, 2005).

## MATERIAL AND METHOD

In this experience, were investigated two F<sub>1</sub> hybrids of tomatoes (Alambra, Cyprian) used as scions and four F<sub>1</sub> hybrids of tomatoes (Titron, Beaufort, Suketto, Konkurabe) used as rootstocks..

**Alambra** - tomatoes F<sub>1</sub> hybrid with undetermined port, type "Long Shelf Life", suitable for cultivation in spaces protected and open field. It have tolerance to: *Tobacco mosaic tobamovirus* pathotype 0, *Cladosporium fulvum* race 5, *Fusarium oxysporum* f.sp. *lycopersici* race 2, *Verticillium albo-atrum* and *Meloidogyne* sp.

**Cypriana** - tomatoes F<sub>1</sub> hybrid with undetermined port, suitable for cultivation in spaces protected and open field. It have tolerance to: *Tobacco mosaic tobamovirus* pathotype 0, *F. oxysporum* f. sp. *lycopersici* race 1, 2, *V. albo-atrum*, *Meloidogyne* sp. and medium tolerance to *Tomato yellow leaf curl begomovirus*.

**Titron** is characterized by resistance to: *TMT* pathotype: 0,1,2, *V. albo-atrum*, *F.o. var. lycopersici* race 0,1, *F.o. lycopersici* race 0,1, *M. incognita*, *C. fulvum* a, b, c, d, e, *V. dahliae*. It is tolerant to *Pyrenochaeta lycopersici* and print to plants: rusticity and vigor. Is recommended especially on soils with strong attack of nematodes.

**Beaufort** is a rootstock that print the plant resistance to: *TMT* pathotype: 0,1,2, *V. albo-atrum*, *F.o. radialis-lycopersici* race 2, *M. incognita*, *M. javanica*, *C. fulvum*, *P. lycopersici*, *Clavibacter michiganensis* subsp. *michiganensis*. It is strongly recommended on terrains with strong attack by *P. lycopersici*. The plants are vigorous.

**Konkurabe** is a rootstock used for high resistance to: *TMT* pathotype: 0,2 *Ralstonia solanacearum*, *V. albo-atrum*, *F.o. lycopersici* race 0.1; *M. incognita*, *P. lycopersici*, *V. dahliae*. Gives plants a medium vigor, a shallow root system and is recommended for soils with high humidity.

**Suketto** is characterized by high resistance to: *TMT* pathype 0,2; *R. solanacearum*, *V. albo-atrum*, *F.o. lycopersici* race 0,1, *M. incognita*, *P. lycopersici*, *V. dahlia*. The grafted plants on this rootstock are vigorous. It is recommended at cultures with longer period of vegetation (Bogoescu et al., 2008).

Experience has included 10 work variants, each was obtained from 300 scion plants x 300 plants rootstock : V<sub>1</sub>-Alambra F<sub>1</sub>/Titron, V<sub>2</sub>-Cypriana F<sub>1</sub>/Titron; V<sub>3</sub>-Alambra F<sub>1</sub>/Beaufort V<sub>4</sub>-Cypriana F<sub>1</sub>/Beaufort; V<sub>5</sub>-Alambra F<sub>1</sub>/Konkurabe; V<sub>6</sub>-Cypriana F<sub>1</sub>/Konkurabe, V<sub>7</sub>-Alambra F<sub>1</sub>/Suketto; V<sub>8</sub>-Cypriana F<sub>1</sub>/Suketto, V<sub>9</sub>-Alambra F<sub>1</sub> (control 1), V<sub>10</sub>-Cypriana F<sub>1</sub> (control 2).

Observations and biometric measurements were made at the root system and the part aerial of the grafted seedlings and the normal seedlings (control).

The results were interpreted statistically (analysis of variance, Fisher test).

Variance analysis was performed concerning the total mass values, based of scion hybrid, for rootstocks experienced.

The statistical assurance of the differences between variants was determined using variance analysis (Iordăchescu, 1976).

## RESULTS AND DISCUSSIONS

The results concerning the growth and the development of the normal and grafted tomatoes seedlings are shown in table 1.

Table 1

## Indicators of growth of tomato seedlings at the time of planting

Variant	Combination (rootstock x scion)	Height of aerial part (cm)	Diameter of stalk (mm)	Roots length (cm)
V <sub>1</sub>	Alambra F <sub>1</sub> /Titron	18,7	7,5	13,8
V <sub>2</sub>	Cypriana F <sub>1</sub> /Titron	18,5	7	13,6
V <sub>3</sub>	AlambraF <sub>1</sub> /Beaufort	17,8	8	14,5
V <sub>4</sub>	Cypriana F <sub>1</sub> /Beaufort	17,6	8	14,2
V <sub>5</sub>	Alambra F <sub>1</sub> /Konkurabe	19,5	7,5	12,6
V <sub>6</sub>	Cypriana F <sub>1</sub> /Konkurabe	19,7	7	12,3
V <sub>7</sub>	Alambra F <sub>1</sub> /Suketto	19,5	7,5	12,8
V <sub>8</sub>	Cypriana F <sub>1</sub> /Suketto	20,0	7	12,5
V <sub>9</sub>	Alambra F <sub>1</sub>	20,3	6,5	11,5
V <sub>10</sub>	Cypriana F <sub>1</sub>	20,5	6	11,2

At all indicators of growth, are observed higher values in grafted variants compared with control variants, normals; less on the plant height (17,6-20 cm/grafted; 20,3-20,5/normals), elongation of plants was set on grafting (scions and rootstocks cut short).

For grafted plants, the highest values of the indicators determined (stalk diameter and root length) have obtained variants grafted on Beaufort rootstock (V<sub>3</sub>, V<sub>4</sub>).

Concerning the diameter of the stalk, followed grafted variants on others rootstocks (Titron, Konkurabe, Suketto). Is observed a higher growth in diameter at rootstocks grafted with Alambra scion (7,5 mm) compared with Cypriana scion (7mm). On normal plants, the stalk diameter values indicate a lower quality planting material (6 - 6,5 mm). At Root length, have followed variants grafted on Titron rootstock 13,6 - 13,8 cm (V<sub>2</sub>, V<sub>1</sub>), then Konkurabe rootstock 12,3 - 12,6 cm (V<sub>6</sub>, V<sub>5</sub>) and Suketto rootstock 12,5 - 12,8 cm (V<sub>8</sub>, V<sub>7</sub>), then normal plants 11,2 - 11,5 cm (V<sub>10</sub>, V<sub>9</sub>). Is observed a superior length at variants with Alambra scion.

The results concerning analysis of variance to total mass values, depending on the scion hybrid, for rootstocks experimented are shown in the table of the variances (table 2).

Table 2

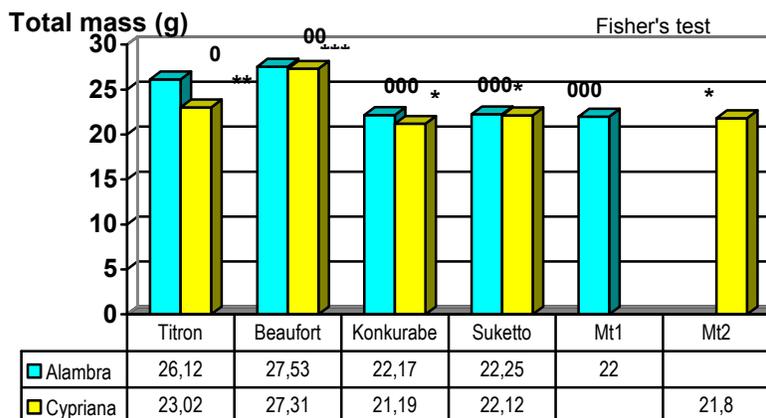
## Analysis of variance for variants at total mass of tomatoes

Source of variance	SSD	DF	d <sup>2</sup>	F
Between groups	0,32	1	0,32	2
Within the group	3,71	23	0,17	
Total		24		

By calculating the factor F of Fisher's exact test, were obtained the F function values: 4,28 and 7,88; it follows that it is less than the theoretical F factor for  $\alpha = 5\%$  and  $\alpha = 1\%$ , so the difference between variances is insignificant.

Analyzing the results obtained on the variation of the total mass (g/pl.) - fig. 1, depending on the scion hybrid, for rootstocks experienced is observed that

lowest values were recorded at normal variants and large values at variants grafted on Beaufort rootstock; for all variants results are insignificant for both types of scion hybrids used in grafting (Alambra and Cypriana).



**Fig. 1** -Total mass variation depending on the scion hybrid, for the rootstocks investigated

At Alambra scion, the values were higher at grafted variants, at all rootstocks, but and at the control variants - normal Alambra was superior of the normal Cypriana variant.

### CONCLUSIONS

1. At grafted seedlings studied, the growth indicators had superior values, quality comparative with the normal seedlings.
2. By cutting plants, at grafting was performed adjustment of the plant in height.
3. The rootstocks used in research has printed the plants vigor; the grafted tomatoes had the stalk diameter and roots length superior than the grafted tomatoes.
4. The total mass of the grafted seedlings was higher than that of the normal seedlings.
5. Alambra had determined a superior vigor to all combinations, compared with Cypriana.

### REFERENCES

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