

STUDY ON IMPROVEMENT OF PRODUCTION TECHNOLOGY BY GRAFTED WALNUT SEEDLINGS

STUDIUL PRIVIND ÎMBUNĂȚIREA TEHNOLOGIEI DE PRODUCERE A MATERIALULUI SADITOR PRIN ALTOIRE LA NUC

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Abstract: The study was conducted during 2011-2013, in the climatic conditions in the Baltati region, Iasi County. The settings up of the field was done using direct seeding in the field in protected conditions (solar tunnel) using walnuts from current year production and have not undergone any treatment to stimulate germination before sowing. Seeding distance was 75 cm between rows and 10 cm on the row and sowing depth was 5 cm. For grafting was used chip budding method, grafting into two periods: August 2012 (the sleeping bud) and April 2013 (the growing bud). For grafting in August, graft branches were used, which were shaped in two different moments: removing leaves and stems, keeping a portion of 2 cm, make two months before harvesting the graft branches (V1) and trimming the leaves graft branches at harvest (V2). For grafting in April were used branches harvested in late autumn and stored over winter in deposits setpoints 2-4 °C (V3). The walnut germination percentage was 61.4%, with grafting percentage of 67.8% (V1), 30.2% (V2) and 48.8% (V3) and the percentage of grafted trees STAS was 26% at Anica variety and 59% at Prezident variety.

Key words: Walnut, variety, grafting, chip budding, greenhouses.

Rezumat: Studiul a fost efectuat în perioada 2011-2013, în condițiile pedoclimatice din zona Baltați, județul Iași. Înfuițarea câmpului I s-a realizat prin semănat direct în câmp, în condiții protejate (solar de tip tunel) Nucile folosite provin din producția din anul curent și nu au fost supuse niciunui tratament pentru stimularea germinației înainte de semănat. Distanța de semănat a fost de 75 cm între rânduri și 10 cm pe rând iar adâncimea de semănat a fost de 5 cm. Pentru altoire a fost utilizată metoda chip budding, în două perioade de altoire: august 2012 (cu mugur dormind) și aprilie 2013 (cu mugur crescând). Pentru altoirea din august s-au folosit ramuri altoi, care au fost fasonate în două momente diferite: înlăturarea frunzelor și menținerea unei porțiuni de pețiol de 2 cm, efectuată cu o lună înainte de recoltarea ramurilor altoi (V1) și respectiv, fasonarea frunzelor în momentul recoltării ramurilor altoi (V2). Pentru altoirea din aprilie s-au folosit ramuri recoltate toamna târziu și păstrate peste iarnă în depozite la temperaturi de 2-4°C (V3). Procentul de germinare a nucilor a fost de 61,4 %, prinderea la altoire de 67,8 % (V1), 30,2 % (V2) și 48,8 % (V3) iar procentul de pomi altoiți STAS a fost de 26% la soiul Anica și 59 % la soiul Prezident

Cuvinte cheie: Nuc, soiuri, altoire, chip budding, solarii.

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INTRODUCTION

Quality planting material used walnut plantations is essential for efficiency. Since requests for the walnut seedlings in recent years began to grow, Romanian markets is not sufficiently achieved by grafting seedlings and are valued at current high prices, there is a tendency to use the material obtained by seed (Cociu et al., 2006).

Unlike other fruit species, walnut grafting is a technological sequence requires special conditions to get good results.

Environmental conditions during and after grafting have a very important role in callus formation in walnut (Avanzato, 2001)

Grafting in improved copulation and forcing material into rooms after grafting, remains one of the most used technologies but production costs quite high (Achim and Botu, 2001).

With walnut grafting in the field, not favorable environmental conditions are registered each year and the results are not satisfactory (Turcanu and Comanici, 2004).

The objective of this study is to highlight the possibility of walnut grafting in protected areas.

MATERIAL AND METHOD

To establish first field, nuts were sown in November 2011 in a solar tunnel with a length of 20 m, 10 m and height of 4.5 m from the center. Nuts used come from the production of the current year and not have undergone any treatment to stimulate germination before sowing. Seed distance was 75 cm and 10 cm between rows at a time, and the depth of seeding was 5 cm.

For grafting was used chip budding method, grafting into two periods: August 2012 (with bud sleeping) and April 2013 (the bud growing).

For August grafting were used graft branches that were trimmed in two different moments: removing leaves and maintain a portion of petiole 2 cm, made a month before harvesting the graft branches respectively, trimming branches leaves at harvest. For grafting in April were used branches harvested in late autumn and stored over winter in deposits setpoints 2-4°C.

During the period of vegetation to make specific maintenance works. Combating disease and pest control is carried out through the application of 6-8 treatments with bordeleza juice 0.5-1% or with other products mixed with copper based insecticides (Hartmann et al., 2001).

RESULTS AND DISCUSSION

The percentage of germination was 61.4 % walnut, very good results provided that they had been previously sown with being layered (Tab. 1; Fig. 1, Fig. 2).

Seedling diameter at a height of 10 cm from the ground when grafting was 14.2 mm and height 108.2 cm. (Tab. 1; Fig. 3, Fig. 4). Providing branch graft quality is a key factor in the success of the walnut grafting.

The percentage of grafting was gripping differently depending on the time of grafting and how to prepare graft branches.

If grafting in August 2012, the version in which the graft branches were shaped leaves, leaving a portion of the petiole 2 cm, a month before grafting resulted in a very good grip grafting 67.8 %. The version that graft branches were trimmed by removing leaves in just moments of clamping grafting, the percentage was low, respectively 30,2% (tab. 2).

If grafting in April 2013) the growing bud, graft branches were harvested in November and stored over winter at temperatures of 2-4 ° C and catching grafting was 48.8%

Table 1

The percentage of germination and seedlings growth rootstock to graft

Rootstock	Germination percentage			Increased seedling rootstock to graft	
	No seeded nuts	Number . Of germinated nuts	% germination	Seedlings to 10 cm diameter soil (mm)	Rootstock seedlings height (cm)
<i>Juglans regia</i>	1620	995	61,4	14,2	108,2



Fig. 1 - Sown in the first field



Fig. 2 - Seedling emergence in the first field

Table 2

Influence of grafting period and when trimming the branches catching grafting scion

Grafting period	Moment of trimming the branches	Number . trees grafted	No trees trapped in grafting	Percent grafting grip %
15-25 August 2012	Removing leaves a month before grafting	299	203	67.8
	Forming the day of grafting	314	95	30,2
April 2013	Branches stored at 2-4 ° C and stored over winter	313	153	48.8



Fig. 3 - First field before grafting

Fig. 4 - Preparing for grafting first field

Prezident variety grafted start in vegetation accounted for 60 % of the production of fruit trees grafted and grafted STAS was 59.0 %. (Tab. 3).

If variety Anica somewhat weak results from Prezident variety, rootstock that turn the vegetation represented a share of 30 % and production of grafted trees STAS was 26 , 0 %

If grafting spring (April, 2013) in both the percentage of grafted varieties start to vegetation was between 42.2 and 49.5% and production of grafted trees was 33.0 % STAS variety Anica and 41,0 % at Prezident variety .

Data on the growth of trees grafted second field trees reveals good results obtained in the two varieties of walnut, the differences between them are insignificant. Therefore, when the tree was removed from nursery they had

dimensions of 200 cm height and 80 cm diameter by 12 mm height. (tab. 5, fig. 5, fig. 6).

Table 3

Behaviour in the nursery of two trees of Walnut grafted onto rootstock Juglans regia, august 2012

Grafting period	Grafted variety	Total no. of grafted trees	Scions started in vegetation (%)	No. of perished trees (pcs.)	STAS trees obtained (pcs.)
August 2012	Anica	314	30,2	13	82
	Prezident	322	63,0	12	190
April 2013	Anica	218	42,2	20	72
	Prezident	232	49,5	19	96

Table 5

The influence of grafting on growth period of trees

Grafting period	Variety	Scion diameter at base (mm)	Graft diameter 80 cm height (mm)	Trees height (cm)
August 2012	Anica	19,0	16,1	201,7
	Prezident	17,1	12,6	210,4
April 2013	Anica	12,6	10,6	183,6
	Prezident	12,6	9,6	183,6



Fig. 5 - Images from second field

Fig. 6 - Drip irrigation field II

CONCLUSIONS

1. Grafting at the table, in the walnut and perfected copulation forcing material grafted into protected areas, in terms of 26° C, relative air humidity 50-60%, for 14 days, remains the most widely used method of propagating for the walnuts.

2. *Juglans regia* rootstock growth in the protected space is superior both as force growth and the uniformity compared to the walnut rootstocks produced in the field.

3. Ensuring quality scion branch is a key factor in the success of grafting in walnut. The branches have been trimmed by about a month before grafting influenced the percentage of positive grip, with the highest percentage of all experience.

4. Setting up the solar field, and by direct seeding and grafting seedlings in chip budding may be one of the technological sevențele ensures seedlings grafted both quantitatively and qualitatively, can more easily control the environmental conditions in the protected spaces.

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