TECHNOLOGICAL ASPECTS CONCERNING ESTABLISHMENT THE PHENOTYPIC COMPATIBILITY ROOTSTOCK/SCION TO WATERMELONS

ASPECTE TEHNOLOGICE PRIVIND STABILIREA COMPATIBILITĂȚII FENOTIPICE PORTALTOI/ALTOI LA PEPENI VERZI

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Abstract. *The research was realized in the Laboratory of Protected Cultures of the ICDIMPH-Horting Bucharest, in 2012 year. Were watched technological aspects concerning the phenotypic compatibility from rootstocks and scions at watermelons. The biological material used was composed from scions – Santa Vittoria F_1 – watermelons and rootstocks – Shintoza F-90 and TZ 148. The TZ 148 rootstock obtained a better result concerning forming the callus at plants. Were established the stages of the technological flow for obtaining grafted seedlings at the cultivars researched. By the quality of the seedlings the depends the success of the cultures realized with grafted plants in terms of quality and quantity.*
Key words: *grafting, cucurbits, technology*

Rezumat. *Cercetarea s-a realizat în Laboratorul de Culturi Protejate al ICDIMPH-Horting Bucureşti, în anul 2012. Au fost urmărite aspect tehnologice privind compatibilitatea fenotipică dintre portaltoi şi altoi la pepeni verzi. Materialul biologic folosit a fost alcătuit din altoi – Santa Vittoria F_1 – pepeni verzi şi portaltoi – Shintoza F-90 şi TZ148. Portaltoiul TZ148 a obținut un rezultat superior privind calusarea plantelor. Au fost stabilite etapele fluxului tehnologic pentru obținerea răsadurilor altoite la cultivarurile cercetate. De calitatea materialului săditor depinde reuşita culturilor realizate cu plante altoite din punct de vedere calitativ şi cantitativ.*
Cuvinte cheie: *altoire, cucurbitacee, tehnologie*

INTRODUCTION

Grafting vegetables is an agronomic activity used worldwide. The grafted seedlings induce to crops: quality, productivity and resistance to diseases (*Fusarium* spp., *Verticillium* spp.) and pests (nematodes) transmitted through the ground (Bogoescu et. al., 2008).

The method is based on the fusion of scion and rootstock - wild variety (Edelstein, 2004). Scion and rootstock plants must be phenotypically compatible, to have the same diameter in the area where it makes cutting and joining.

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In Romania, the watermelons culture is very popular; sensitivity to diseases and pests has imposed introduction grafting cultivars on resistant rootstocks (Bogoescu et al., 2010).

MATERIAL AND METHOD

The rootstocks used for the grafting of watermelons were TZ 148 and Sinthoza.

TZ 148 F_1 - fig. 1 - is resistant to *Fusarium oxysporum radicis-cucumerinum* 0,1, 2, *F.o.f.*sp. *melonis* 0,1, 2, *Verticillium dahlie*, *Meloidogyne* spp.

The plants obtained on this rootstock have high vigor, stronger root and produce higher crops.

Shintoza F-90 (*C.maxima* x *C.moschata*) - Fig. 2 - give resistance of the cultures to *F.o. radicis-cucumerinum* 0,1,2 *F.o.f.*sp. *melonis* 0,1,2, *V. dahlie*, *M. incognita*, *M. javanica*. The fruits obtained from these plants are tasty and early.

Fig. 1 - Rootstock TZ 148, plants in seedling stage

Fig. 2 - Rootstock Shintoza F-90, plants in seedling stage

The scion used in grafting was a F_1 hybrid of watermelon, **Santa Vittoria** – fig.3. It is a hybrid of semi-early watermelon, vigorous, with big number of fruits/plant and high production. The fruit have a particular color, light green with dark green stripes. The average weight is 12-14 kg. The pulp is intense red color, crispy and sweet. Presents an excellent adaptability to conditions in Romania. It is resistant/tolerant to certain diseases, such as fusariosis and some antracnosis.

Fig. 3. Scion plants from Santa Vittoria cultivar

Experience has included two variants of work (300 scion plants x 300 rootstock plants) / variant:

V_1 - Santa Vittoria x Shintoza;

V_2 - Santa Vittoria x TZ 148.

The grafting technique has supposed a technological process: sowing (scion and rootstock), preparation of grafting, grafting itself, the introduction of grafted plants in tunnel covered with polyethylene to callusing, transferring seedlings in greenhouse for growing and maintenance in accordance with the standard technology (Bogoescu et al., 2008).

Sowing scion and rootstock

The rootstock was sowing after the emergence of the scions because the rootstock has a high germination energy, vigor and a strong growth from emergence. The dates of sowing must be strictly respected, because to graft with successfully is required that the stems (scion and rootstock) to have the same thickness.

The sowing was done classically, in a substrate free of pests and diseases, in alveolar trays (3/3 cm/alveoli). During germination, the temperature was 28^0C, day and night and the relative humidity (RH) was 98-100%.

Both the scion of melon, but and the rootstock used germinate easily, in about 3 days after sowing. The scion and rootstock plants were maintained until grafting according to standard technology presented by Popescu and Atanasiu, 2011.

Preparing of grafting

The preceding operations of the grafting have consisted in the supply with necessary materials (clamps for grafted, from silicone, different sizes, as the rootstock

and scion diameter, razor blades, disinfectants for hands, sorting and watering of seedlings.

Grafting

The grafting process was performed in indirect light, with an optimum shading when the weather was sunny. The temperature was 21-22^{0}C. The grafting method was by joining of the plants. The grafting was done mechanized, using robot for grafting (fig. 4).

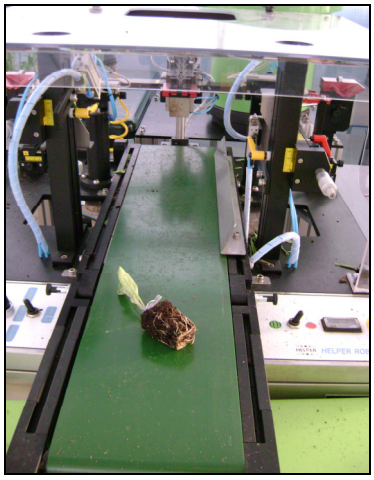

Fig. 4. Semi-mechanized robot for grafting

To grafting, the cutting and the joining of plants were made mechanized, with robot for grafting. The manual works were sorting of seedlings and placing in the places of cutting of the machine, collection of grafted plants in alveolar trays, the feeding of the robot for grafting with clamps.

RESULTS AND DISCUSSIONS

The researches have established the technological dates for the production phases of the watermelons grafted seedlings for combinations studied (scion x rootstock) - table 1.

Table 1

Results concerning established the technological dates for the production of the watermelons grafted seedlings

S C I O N **ROOTSTOCK**	**SOWING data**	**EMERGENCE data**	**GRAFTING data**	**CALUSSING %**
Santa Vittoria Shintoza	4.03. 16.03.	8.03. 18.03.	24.03.	93
Santa Vittoria TZ 148	10.03. 23.03.	14.03. 27.03.	1.04.	94

Is observed the germination energy quality of the rootstock and scion cultivars; the plants have emergence in four days from sowing. Due the high vigor of the plants, the rootstock seeds were sown at 12-day (Shintoza) and 13 days (TZ 148) difference by the scion plants (Santa Vittoria).

The grafting operation was realized after five days (TZ 148) and six days (Shintoza) from the emergence of the rootstocks; the phase of emergence of the first true leaf was recorded at 16 days - the scion (Santa Vittoria), grafted on Shintoza and at 15 days - the scion (Santa Vittoria), grafted on TZ 148 (fig. 5).

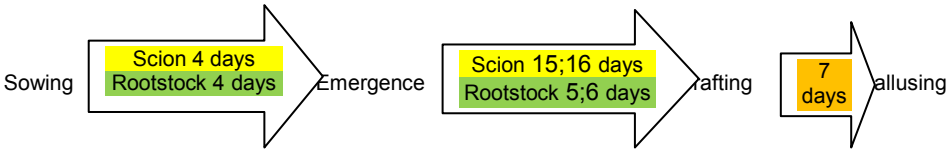

Fig. 5 - Technological stages of grafting

The callusing percentage of the plants grafted mechanized, using the robot for grafting, was 93-94%.

Difference by 1% between the two variants was due to a phenotypically mismatch between scion and rootstock, leading to the absence of tissue fusion of the two partners. The capacity of forming of the callus at the plants, depending on variant, is shown in figure 6.

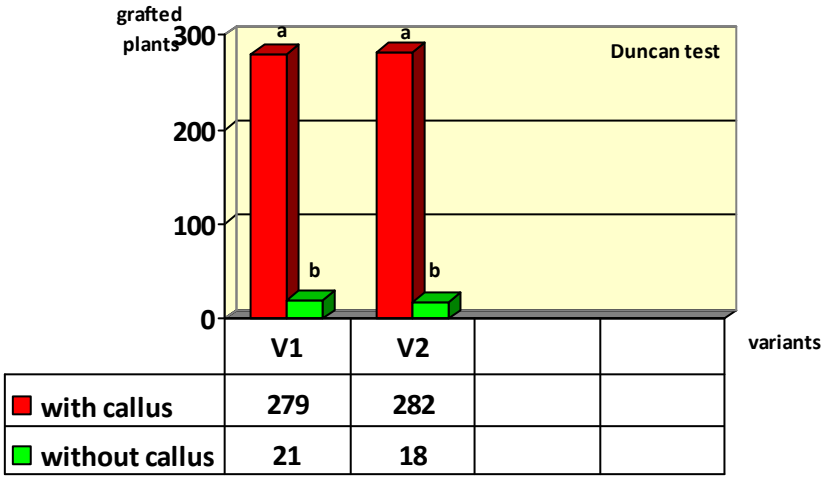

Fig. 6 - The callusing of the plants at variants researched

- V_1 variant - from 300 grafted plants, 279 plants have formed callus;
- V_2 variant - from 300 grafted plants, 282 plants have formed callus;
- the difference is insignificant between variants, but very significant in variant, between the number of plants with callus and the number of plants without callus.

CONCLUSIONS

1. Were correlated dates of the technological stages, depending on the cultivars researched, ensuring thus the phenotypic compatibility rootstock-scion.

2. Were obtained percentages of callusing 93% (Santa Vittoria x Shintoza) and 94% (Santa Vittoria x TZ148).

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