Establishment of Technological Stages for Obtaining Some Grafted Tomato Seedlings (Dutch Scion × Romanian Rootstocks)

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Abstract

The tomatoes are valuable vegetables, with highest share in Romanian crops from protected spaces. The grafting is a vegetative multiplication method that induces or improves some qualities of the plants (vigor, resistance to soil diseases and pests, resistance to abiotic factors, quantity and quality of fruit production). The research aim has been to establish the technological stages for producing of Dutch scion and Romanian rootstock seedlings from *Solanum lycopersicum* L. species, to obtain some compatible phenotypes for grafting. This research has been conducted in a greenhouse of the Horting Institute Bucharest. The experience was carried out on a tomato cultivar collection consisting from a Dutch scion ('Abellus' F₁ hybrid) and three Romanian rootstocks ('L₅₄₂', 'L₅₄₃', 'L₅₄₄'). The scion and rootstock diameters have been correlated for manual grafting, cutting at 45 degrees and using the method of splice in silicone tube. The technological stages for obtaining grafted tomatoes have been established for the researched genotypes. These tomato combinations have been compatible for vegetable crops in protected spaces in the south area of Romania.

Keywords: Dutch scion, grafting, *Solanum lycopersicum* L., Romanian rootstocks

Introduction

The tomatoes are vegetables very much cultivated in the protected spaces from Romania. The grafting is an agronomic method that induces or improves plant vigor, resistance to soil diseases (*Fusarium* sp. and *Vertillium* sp.) and pests (*Meloidogyne* sp.), resistance to abiotic factors, quantity and quality of tomato yield.

The grafting has been developed because soil borne pathogens are a serious problem, that can be avoided by using resistant rootstocks (Doltu *et al.*, 2015). Some cultivars are not able to adapt to protected cultivation, withstand soil born disease pressure and extreme changes in temperature and moisture (Leonardi and Romano, 2004).

The grafting can be performed successfully if the plants (scion and rootstock) have similar diametres (Doltu *et al.*, 2013).

Aims and objectives

The aim of this experience has been to establish the technological stages (calendar dates and days between stages) for producing the 'Abellus' Dutch scion and the 'L₅₄₂', 'L₅₄₃' and 'L₅₄₄' Romanian rootstocks, to obtain some plants with compatible phenotypes, similar diametres for grafting by plant cutting at 45 degrees.

Materials and methods

This experience has been realized in a greenhouse for grafted vegetable seedlings from the Horting Institute Bucharest in 2018.

The research was carried out on some tomato cultivars: a Dutch scion ('Abellus' F₁ hybrid) from Rijk Zwaan company and three Romanian rootstocks ('L₅₄₂', 'L₅₄₃' and 'L₅₄₄') from the

Table 1. Technological dates for obtaining of grafted tomato seedlings

	Sowing		Emergence		Grafting		Callusing
	date	no. of days	date	no. of days	date	no. of days	date
Rootstock 'L542'	19.02	7	26.02	21b	18.03	7	25.03
Rootstock 'L543'	19.02	7	26.02	21b	18.03	7	25.03
Rootstock 'L544'	19.02	7	26.02	21b	18.03	7	25.03
Scion 'Abellus'	26.02	5	03.03	18a	18.03	7	25.03

Duncan test $p < 0,05$

germplasm bank of the Research and Development Station for Vegetable Growing Buzău.

The plants have been obtained in alveolar plates (100 alveoli per plates and a capacity of 24 ml per alveoli) on peat substrate with a grain size 0-10 mm, NPK (1 kg/m³), microelements B, Mg, Cu, Mn, Zn, Fe, S (0.050 kg/m³), chalk (4.7 kg/m³), pH 6 and wetting agent 100 ml/m³.

'Abellus' is an early hybrid with indeterminate growth, red and spherical fruit, slightly flattened and average weight of 150–180 g. It is cultivated in protected spaces and field.

'L₅₄₂', 'L₅₄₃' and 'L₅₄₄' are three tomato cultivars tested for approval as rootstocks.

The technology for obtaining of scion and rootstock seedlings has been according to the ecological requirements of the *S. lycopersicum* species.

Obtaining grafted tomato seedlings has involved following steps: sowing of scion and rootstocks, preparing for grafting, grafting, forming of callus, transferring of seedlings from the tunnel for callus forming in the growing space. After sowing, the plants have been increased in classic conditions for tomato seedlings.

The statistical analysis has been carried out by Duncan's test.

Results and Discussion

The scion and rootstocks have had similar diameters and so the grafting has been performed successfully by manual cutting at 45 degrees and splice in silicone tube.

The technological stages for obtaining grafted plants have been established on calendar dates and days for the researched tomato cultivars (Tab. 1).

The Duncan test shows that between rootstocks and scion have been small differences; the grafting has been made in 21 days ('L542', 'L543' and 'L544') and 18 days ('Abellus') from emergence of plants. The plants have had 2,5 mm

diameters and 4 leaves at grafting. The grafting was performed successfully (95% grafted plants/ rootstock cultivar). The optimum diameter is 1,5 mm (Bogoescu *et al.*, 2008). The grafting of some Japanese hybrids was achieved after 16–18 days and 19–20 days from scion emergence and 13–14 days from the rootstock emergence (Doltu *et al.*, 2013).

Conclusion

The technological steps have been set up to get a phenotypic compatibility of the plants at grafting moment; the plants (scion and rootstock) have had similar diameters for producing Dutch grafted tomato seedlings ('Abellus') on the Romanian rootstocks ('L542', 'L543' and 'L544').

Between the 'L542', 'L543' and 'L544' rootstocks and the 'Abellus' scion have been small differences at grafting. These new tomato combinations (Dutch scion × Romanian rootstocks) obtained by grafting at the Horting Institute in 2018 have been compatible for vegetable crops in the protected spaces from Romania.

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