Technological aspects concerning the grafting of some japanese tomatoes

Doltu Mădălina¹, Bogoescu M.¹, Sora D.¹

¹Research and Development Institute for Processing and Marketing of the Horticultural Products Bucharest

*Corresponding author. Email: doltu_mada@yahoo.com

Abstract  The research watched establishing the technological flow for grafting of a Japanese tomatoes collection for cultivation in greenhouse (second cycle). The works were realised in the Laboratory of Protected Cultures of the ICDIMPH-Horting Bucharest, in 2010 year. Laboratory have a greenhouse specialized in producing from vegetables grafted seedlings. Greenhouse consists from room for grafting, with tunnels for forming the callus and room for growing. The biological material used was composed from scions – Japanese tomatoes F₁ hybrids (Red Ore, Shifuku and Kanpuku) and rootstocks from Lycopersicon specie, F₁ hybrids (Suketto, Konkurabe and Beaufort). Grafting was performed manually, with silicone tubes for grafting. Beaufort rootstock obtained the best result (98%), followed by Suketto and Konkurabe (97%). Were established the dates of the technological stages for production of the grafted seedlings in the Japanese tomatoes collection. The researches concerning grafting of the tomatoes are important; the quality of the planting material influences the success of the crop (quality and production). The Japanese tomatoes hybrids are an important biological material for the cultures from protected spaces (second cycle) in Romania.

The grafting of the vegetables is widely practiced worldwide. Recently, the grafting has gained momentum in Romania.

The Research and Development Institute for Processing and Marketing of the Horticultural Products – Horting Bucharest has experience in the grafting of the vegetables; the researches began in 2005 and continues and today.

The grafting is based on the merge between scion and rootstock, wild variety [3].

The grafted plants have resistance to soil diseases (Fusarium spp., Verticillium spp., VMT, Pyrenochoeta lycopersici) and nematodes [1, 2].

For a successful grafting must established the technological steps for obtaining grafted seedlings, depending on the cultivars used as scion and rootstock.

The Japanese tomatoes hybrids are an important biological material for the cultures in protected spaces (second cycle) from Romania.

Materials and Methods

The technology for obtaining grafted seedlings of tomatoes implies following steps: seeding the scion, seeding the rootstock, preparing for grafting, grafting, forming the callus, transferring the seedlings from the tunnel for callus forming in the growing space.

To obtain scion and rootstock seedlings were used: alveolar trays with a volume of 24 ml/cell; peat with granular structure of 0-10 mm, pH = 6, fertilized and F₁ hybrid seeds.

The scions were tomatoes Japanese (F₁ hybrids) - Red Ore, Shifuku and Kanpuku - with indeterminate growth, early, productive, resistant, designed for greenhouse, second cycle.

The rootstocks: Beaufort induce resistant to: Tomato Mosaic Tobamovirus pathotype 0,1,2; Verticillium albo-atrum; Fusarium oxysporum radicus-lycopersici race 2; Meloidogyne incognita; Meloidogyne javanica; Cladosporium fulvum; Pyrenochoeta lycopersici; Clavibacter michiganensis subsp. Michiganensis; Konkurabe are resistenta ridicata la Tomato Mosaic Tobamovirus pathotype: 0,2; Ralstonia solanacearum; Verticillium albo-atrum; Fusarium oxysporum radicus-lycopersici race 0,1; Meloidogyne incognita; Pyrenochoeta lycopersici; Verticillium dahlia; Suketto induce big resistant to Tomato Mosaic Tobamovirus pathotype: 0,2; Ralstonia solanacearum; Verticillium albo-atrum; Fusarium oxysporum radicus-lycopersici race 0,1; Meloidogyne incognita; Pyrenochoeta lycopersici; Verticillium dahlia [1].

Was used the classical technology of production of tomatoes seedlings.

The grafting was performed manually; the cutting of plants with razor blades to 45 degrees (figure 1).
Joining the rootstock with the scion was done in a silicone tube (figure 2).

After grafting, the plants were introduced for 7 days in tunnel for callusing (figure 3); in tunnel, the relative humidity was 100% and temperature 23-25°C.

Forming the callus was during 3 days and transferring the seedlings from the tunnel to the growing space was realised after 7th day (figure 4).
Each variant was obtained from 300 scion plants x 300 rootstock plants.

Results

The experience results have established the technological dates for the production phases of the tomatoes grafted seedlings for combinations scion x rootstock researched (table 1).

<table>
<thead>
<tr>
<th>Variant</th>
<th>Scion</th>
<th>Rootstock</th>
<th>Seeding S<em>and R</em></th>
<th>Emergence S</th>
<th>Grafting</th>
<th>Planting</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>RED ORE</td>
<td>BEAUFORT</td>
<td>14.05.</td>
<td>17.05.</td>
<td>2-4.06.</td>
<td>16.07.</td>
</tr>
<tr>
<td>V2</td>
<td>KANPUKU</td>
<td>BEAUFORT</td>
<td>16.05.</td>
<td>19.05.</td>
<td>6-7.06.</td>
<td>17.07.</td>
</tr>
<tr>
<td>V3</td>
<td>SHIFUKU</td>
<td>KONKURABE</td>
<td>17.05.</td>
<td>20.05.</td>
<td>8-9.06.</td>
<td>17.07.</td>
</tr>
<tr>
<td>V4</td>
<td>BEAUFORT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V5</td>
<td>SUKETTO</td>
<td>BEAUFORT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V6</td>
<td>SHIFUKU</td>
<td>KONKURABE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V7</td>
<td>RED ORE</td>
<td>SUKETTO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V8</td>
<td>KANPUKU</td>
<td>SUKETTO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V9</td>
<td>SHIFUKU</td>
<td>SUKETTO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S – scion; R – rootstock

The seeding of the rootstocks and scions was done in the same day. It is observed that hybrids were germinated easy; the scions and the rootstocks Beaufort and Konkurabe began to emerge from the 3rd day. The Suketto rootstock was germinated more difficult, the plants began to emerge from the 8th day.

The grafting of the hybrids (Red Ore, Kanpuku, Shifuku) on Beaufort rootstock was achieved after 16 -18 days from the plants emergence; on Konkurabe rootstock was achieved after 19 - 20 days from the plants emergence, on the Suketto rootstock was achieved after 18 - 19 days from the scions plants emergence and 13 - 14 days from the rootstocks plants emergence.

The callusing capacity of the combinations (scion x rootstock)

**Fig. 5.** The callusing capacity of the combinations (scion x rootstock)
Conclusions

The dates of the technological stages of the grafting process were correlated, as was realised the phenotypic compatibility - rootstock x scion.

Were obtained the percentage for callusing of 98% at grafting on Beaufort rootstock and 97% at grafting on Suketto and Konkurabe rootstocks.

It was established the technological process for obtaining of the tomatoes grafted seedlings for the manually grafting of the Japanese cultivars.

The Japanese tomatoes grafted seedlings are recommended to be used as the planting material for the cultures establishment in the greenhouse (second cycle).

References