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THE OPPORTUNITIES FOR PRODUCTION OF QUINCE TREES IN ONE-YEAR-OLD NURSERY

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Abstract

Opportunities for one-year production of quince trees from the Asenitsa, Triumph and Hemus varieties, budded on the quince rootstocks Quince Provence, MA, BA 29 and B 12. For the purpose, the traditional method – a T-budding of a sleeping bud (Two-year-old nursery) was compared to an accelerated method – T-budding of awake bud (one-year-old nursery). It was found that the planted rootstocks were caught very well in both cases.

Sleeping bud budding accelerates interception with 2-3 days. The average duration of capture for a sleeping bud is 17, 48 days, and 19,98 for an awake bud. At the traditional method, the buds were the fastest to an interception on B 12, and at the acceleration method – those on BA 29. In both cases, the highest percentage of offset is at B 12.

The early spring recovery on a soft motion at quince rootstocks, combined with a high level of agrotechnology, allow to produced standart quince trees for one year in nursery.

Keywords: Quince varieties and rootstocks, accelerated production of tree.

INTRODUCTION

Traditional production of planting material of fruit species usually takes place in two consecutive years (Trachev et al., 1975; Palmer et al., 1994; Mitov et al., 1996). The opportunities for accelerating this process in different fruit species are related to the term and the way of grafting (Tatarinov and Zuev, 1984; Palmer et al., 1994; Ferhatoglu, 1997; Kuden and Kaska, 1995). Most often, grafting on table is used during the rest period, using Omega or English copulation (Palmer et al., 1994; Ferhatoglu, 1997; Kuden and Gulen, 1997), or chip-budding with a low soft motion of the rootstocks (Kuden and Kaska, 1995; Arpaci et al., 1998).

The early spring recovery of the low motion in the quince rootstocks used for the pear trees gave us grounds to check the opportunity for producing quality trees in a one-year-old nursery, using the conventional T-budding method.

Table 1. Growth specifics of Asenica quince variety in accelerated production with the application of simple (Si.) and highly improved (H.i.) agro-technology

Rootstocks	Diameter of the rootstocks (mm)		Diameter of the trees (mm)		Height of the trees (cm)	
	Si.	**H.i.**	**Si.**	**H.i.**	**Si.**	**H.i.**
Quince provence	12,31	12,55	5,54	10,67	74,25	160,11
MA	13,20	13,29	5,97	11,23	80,20	136,14
BA 29	11,68	14,32	6,60	11,74	84,70	160,44
B 12	11,59	12,25	6,24	10,60	82,83	133,39

Table 2. Interception of planted rootstocks and thickness during planting and budding in traditional (tr.) and acceleration (acc.) production

Rootstocks	Percentage of the interception		Thickness during planting		Thickness during budding	
	Tr.	**Acc.**	**Tr.**	**Acc.**	**Tr.**	**Acc.**
Quince provence	94,12	87,85	4,80	4,88	9,24	6,08
MA	94,80	89,08	4,83	5,01	9,47	6,12
BA 29	92,34	87,22	4,85	5,09	9,42	6,23
B 12	97,17	91,06	5,01	5,18	10,07	6,42
GD при P = 5%			0,43	0,54	0,57	0,63
1 %			0,59	0,69	0,74	0,78
0,1 %			0,72	0,84	1,25	1,01

Table 3. Duration and percentage of interception of the grafted buds in quince varieties Asenica, Triumph, and Hemus

Rootstocks	Experiment 1 – traditional production				Experiment 2 – accelerated production			
	min days	max days	Average days	interception %	min days	max days	Averag e days	Interception %
Quince provence	14,43	19,27	16,85	91,30	17,43	25,16	21,30	88,00
MA	16,61	21,44	19,03	82,60	17,08	24,83	20,96	82,67
BA 29	14,62	20,35	17,49	88,70	15,43	20,08	17,76	86,67
B 12	14,34	18,72	16,53	98,00	17,10	22,70	19,90	94,00
GD при P=5%			1,84				2,12	
1 %			3,26				4,57	
0,1 %			6,03				7,04	

Table 4. Growth specifics of the Asenica quince variety on four rootstocks in traditional (Tr.) and accelerated (Acc.) production of trees – averaged over the experimental period

Rootstocks	Diameter of the rootstock (mm)		Diameter of the trees (mm)		Height of the trees (cm)	
	Tr.	**Acc.**	**Tr.**	**Acc.**	**Tr.**	**Acc.**
Quince provence	17,48	11,97	15,99	11,11	185,66	139,29
MA	18,02	12,45	16,50	9,98	185,84	136,21
BA 29	17,56	12,53	15,83	10,27	177,82	146,80
B 12	17,16	12,25	15,59	10,51	184,89	132,85
GD при P = 5%	1,78	1,32	1,56	0,66	16,43	15,01
1 %	2,56	1,90	2,24	0,95	23,60	21,57
0,1 %	3,76	2,80	3,30	1,39	34,72	31,37

Table 5. Growth specifics of the Triumpf quince variety on four rootstocks in traditional (Tr.) and accelerated (Acc.) production of trees – averaged over the experimental period

Rootstocks	Diameter of the rootstock (mm)		Diameter of the trees (mm)		Height of the trees (cm)	
	Tr.	**Acc.**	**Tr.**	**Acc.**	**Tr.**	**Acc.**
Quince provence	17,48	11,97	17,18	11,34	161,50	122,29
MA	18,02	12,45	16,58	11,07	155,99	128,40
BA 29	17,56	12,53	15,76	11,37	152,91	131,33
B 12	17,16	12,25	16,21	11,07	154,51	115,59
GD при P = 5%	1,78	1,32	1,27	1,22	12,32	11,27
1 %	2,56	1,90	1,83	1,76	17,70	16,20
0,1 %	3,76	2,80	2,69	2,58	26,03	23,83

Table 6. Growth specifics of the Hemus quince variety on four rootstocks in traditional (Tr.) and accelerated (Acc.) production of trees – averaged over the experimental period

Rootstocks	Diameter of the rootstocks (mm)		Diameter of the trees (mm)		Height of the trees (cm)	
	Tr.	**Acc.**	**Tr.**	**Acc.**	**Tr.**	**Acc.**
Quince provence	17,48	11,97	17,17	11,41	188,09	144,01
MA	18,02	12,45	16,57	10,82	187,90	145,85
BA 29	17,56	12,53	15,92	19,91	179,83	149,02
B 12	17,16	12,25	15,38	10,71	181,86	138,91
GD при P = 5%	1,78	1,32	1,62	0,83	17,95	16,83
1 %	2,56	1,90	2,32	1,19	25,79	24,18
0,1 %	3,76	2,80	3,42	1,76	37,93	35,56

MATERIALS AND METHODS

The opportunities for production of one-year, fit for planting in a permanent place quince trees of Asenitsa, Triumph and Hemus varieties, grafted onto four quince rootstocks (Quince Provence, MA, BA 29, and B 12) were studied in the experimental field of the Department of Fruit Growing in the village of Brestnik, Plovdiv region.

For this purpose were created two parallel experiment, involving the varieties and rootstocks mentioned above:

Experiment 1 – traditional production with two-year-old cultivation, T-budding of a sleeping bud. Traditional agro-technology was applied.

Experiment 2 – accelerated production with one-year-old cultivation, T-budding of an awake bud. A highly improved agro-technology was applied, which until the formation of a top bud from the graft, contains several times feeding with low doses of nitrogen fertilizer and regular irrigation every 10–15 days.

The rooted shoots used in experiment 1 were cut out after the natural fall of leaves (December) and planted in the nursery in March. The shoots used in Experiment 2 had their leaves removed manually, cut and planted in the nursery in the period from

October to November. For Experiment 1, we performed the budding in August, and for Experiment 2 after establishing good soft motion – usually in April.

In both trials, the following indicators were reported: percentage of catching up rootstocks; thickness of the rootstocks after planting and before budding – 10 cm before the soil; duration and percentage of captured live buds; specifics of third varieties produced by traditional or accelerated process.

In Experiment 1, as the end of the period of interception, we determined the fall of 70% of the leaf handle after a light touch; while in Experiment 2, we recorded the duration of the interception from the budding until the swelling or drifting of over 70% of the buds. After the trees were subtracted we noticed the diameter of the rootstock (under the graft), the diameter of the trees (10 cm above the budding), and the height of the trees.

The averaged data for the study period was mathematically processed by the dispersion analysis method.

RESULTS AND DISCUSSION

Table 1 presents the data on the growth specifics of the Asenitsa quince variety – accelerated production, depending on the level of applied agro-technology.

The differences in the application of simple and heavily improved agro-technology appear mainly in the growth of the graft bud. As a result of the increased agro-technology, the average diameter of the trees for all sorts of rootstocks combination is 5 mm larger. The same applies to the height of trees, wherein traditional agro-technology its average length is 80,5 cm, but with more care, the height is already above 145 cm.

Data on the percentage of interception of the rootstocks, their thickness during planting and budding are presented in Table 2.

During both experiments, the percentage of interception of the rootstocks is high, with a slight advantage (5–7%) for traditional production. We think the reason for this is that we have a better degree of tissue supply and a better-developed root system of the rootstocks after their cut out. Nevertheless, we think the pad inosculation obtained in the accelerated production (over 85%) is very good.

As for the thickness of the rootstocks used in the planting, no significant differences were observed, since in both experiments the tendency was to choose shoots of comparatively equal thickness to avoid further variations in their development.

The diameter of the graft rootstocks in both experiments differs to a certain extent, and it is very normal that in Experiment 1 they are thicker by about 3 mm.

An interesting tendency was observed when comparing the thickness of the rootstocks in Experiment 2 during planting and budding. It is obvious that the four rootstocks do not stop their thickening during the winter months and it is over 1 mm, which we attribute to the low, but positive temperatures acting in the area of the root system, leading to relative delay, but not stopping of the development of the root and upper part of the rootstocks.

The duration and percentage of interception of the grafted buds are presented in Table 3. At the traditional production interception process, it takes place within 15–20 days, and the captured buds at the four rootstocks are above 80%.

As duration proved slowest are intercepted buds grafted on MA, but most quickly on B12 and Quince Provence. The intermediate position occupied BA 29. With the highest percentage of interception are buds on B 12.

In Experiment 2 interception process takes place within 17–23 days and the captured buds are also above 80%. Buds grafted on BA 29 are proven fastest. Again the highest percentage of interception on B 12. In both experiments relatively lower are interception on MA.

At Quince Provence, BA 29 and B 12 grafting a sleeping bud is superior grafting on awake bud.

The data on the growth specifics of the Asenica, Triumpf, and Hemus quince varieties on four rootstocks in both experiment are presented in Table 4,5 and 6 respectively. In the three tables, the values for the diameter of the rootstocks are the same because of the recording of all budding rootstocks, and not separately for each variety.

At Asenica variety proven difference has been reported in the thickness of trees when accelerated production, which are thicker on the Provence quince than the MA. We found other proven differences in Triumpf variety. In one case at traditional production, the diameter of the trees is bigger on Provence quince compared to BA 29. On the other, the height of the trees obtained by the accelerated method and grafted on BA 29 and MA is greater than that on B 12. For the other reported data Asenica, Triumpf and Hemus varieties no proven differences are observed.

Summarizing the data in the tree tables we can say that they are comparatively thicker and lower are the trees by Triumpf, but thinner and taller than the Asenica and Hemus.

In both experiments, all the trees received were normally grown and fit for planting

CONCLUSIONS

1. The better tissue supply and better-developed root system give priority to the interception percentage of the rootstocks in traditional production (around 95%), but over 85% of interception of the rootstocks in the accelerated method is also considered very good.

2. The process of interceptions of grafted buds continues 15–20 days at traditional, and 17–23 at accelerated production. In both methods, the caught buds are over 80%.

3. With the highest percentage of interception buds in both attempts is B 12, but at a comparatively lower level is MA.

4. As for as captured buds, grafting on sleeping bud is superior grafting on awake bud.

5. In a two-year and one-year-old nursery are partial differences, that do not lead to general conclusions on differences in the thickness and height of the trees.

6. The accelerated production of quince trees produced results only at a significantly higher level of applied agro-technology in the one-year nursery.

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