

## **RESEARCH ON GROWTH IN THE AIR PART OF DWARF NECTARINES AND PEACHES**

Sinziana Venera Morarita, Aurelia Corina Cosac  
Valahia University of Targoviste, Bdv Carol I, Nr 2, Romania  
E-mail: cristi2morarita@yahoo.com

### **Abstract**

*Research recently conducted in our country aimed at enriching the range of peach by creating and introducing the culture of dwarf and semidwarf varieties of class, showing them superior character of existing varieties in culture. Genetic dwarf trees provide significant economic benefits to the standard peach varieties. Their undeniable advantage to commercial producers refers to eliminating the stairs, reducing the number of cuts, better use of soil resources and climate and light energy in a nutrient limited space. Facilitates a more precise application of pesticides. Also, maintenance, compared with those in existing orchards will be made easier and consume less labor. Also dwarf peach cultivation is accompanied by a number of advantages arising from a higher density of trees per hectare, fruit quality (outcome improvements), simplifying the work of care and harvesting plantation can protect against natural disasters. Dwarf varieties and hybrids of peach and nectarine, with their particular genes are higher early and productivity in relation to their height than standard varieties. To these we can add the decorative characteristic offered by dwarf peach. Due to this, dwarf peach can be grown in flats, in the balconies. Possibility of acceptance in the market of these species depends on developing dwarf varieties with better fruit quality than the existing varieties so far.*

Keywords: biodiversity, sustainability, agricultural system

### **1. INTRODUCTION**

It was intended to highlight the main aspects on the biology of dwarf genotypes, semidwarf and compact, carrying hybridization using valuable standard varieties as maternal genitors and dwarf varieties and hybrids as paternal genitors. Creation of varieties that are easily crossed by seeds, without grafting would help to reduce production costs by nongrafting trees or micropropagation "in vitro". The series of autopolination and hybridization were aimed to obtain dwarf descendants, to be tested for quality, productivity, adaptability, aiming by homologation to become new varieties. The studies and observations taken with dwarf peach varieties and hybrids were aimed to highlight the main aspects of the relationship between growth and fruiting.

### **2. MATERIAL AND METHODS**

Observations and measurements were performed on dwarf trees of varieties and hybrids: Floria, Genetic Dwarf, Garden Beauty, Autumn, VT84G08, VT84MR10P11, VT84G20, VT83A20, VT83BO1, VT83AR18P4, VT84N05, VT84N08. Varieties and hybrids were grafted on franc peach rootstock. The pomological plantation of the farm of EcoHorticulture Company in Bucharest was founded in 2007. Trees were planted at a distance of 3/1,5 m (see scheme of planting) providing a density of 2222 trees / ha. Area planted with dwarf peach is 1300 m<sup>2</sup>. Trees are led free, have a globular crown, dense, with very short branches, very small internodes. Observation were subjected to a number of three trees for each variety or hybrid. Variety was the option. For the 12 variants (varieties, hybrids) analyzed the total number of trees was 36. For the behavior of trees in the growth and fructification were

made some measurements in the years 3 and 4 after planting from 2010 to 2011.

As part of the research biometric measurements were conducted in the years 3 and 4 from planting (2010 2011) on:

- a) tree height (cm);
- b) trunk height (cm);
- c) trunk diameter (mm);
- d) crown height (cm);
- e) crown volume (m<sup>3</sup>)

#### **Biometric measurements**

a) tree height. Each analyzed tree height was measured using a scale rule, data is listed in a table as minimum values, maximum and average. Measurements were taken during the two years and consisted of measuring the 3 trees chosen for analysis. Growth increase was obtained by taking the average values obtained in the two years.

b) trunk height. Was obtained by direct measurement with a ruler. Measurements were analyzed and listed in a table as minimum values, maximum and average.

c) trunk diameter. The three trees of each variant analyzed in diameter were measured by caliper, minimum, maximum and average are listed in a table. Average growth increase was obtained by difference between the two years in study.

d) crown height was obtained by the difference between tree height and trunk height. Measurements focused on the 3 trees subject to analysis, values obtained are recorded in a table as minimum, maximum, average. Based on their growth increase was calculated after one year of vegetation.

e) crown volume. In order to calculate crown volume was agreed that the crown shape is like a sphere, whose volume is given by:

$$\text{vol} = 4/3 \pi R^3$$

For this, two diameters were measured perpendicular. Data were moved to a table. Distinguishing between crown volume obtained in two years to obtain the average growth rate of the crown after a year of vegetation.

### 3. RESULTS AND DISCUSSIONS

After the study on height growth of trees there was a difference between the values obtained from the 12 variants, which concluded that the differences are due largely to the vigor of the variety, a character of genetic determinism.

Analyzing data table 1, we conclude that:

With nectarines:

- **VT 83 B01** variants and **VT 84 MR10P11** largest increases recorded 106 cm, 102 cm respectively.

- **Garden Beauty** and **VT84 N05** variants are characterized by the growth medium 78 cm, 84 cm respectively.

- Version **VT84N08** recorded the lowest increase of only 66 cm.

Based on medium values obtained at each variant during the two years, the average growth rate was calculated, which is superior to high vigor variants : 19 and 13 cm, compared to the other variants.

The smallest increase was recorded on **VT84N08** version and was only 9 cm.

With peaches:

- Maximum value was recorded on versions **VT83A20** and **VT84G20** and was 137 cm and 119 cm respectively.

- A number of 4 variants recorded increase from 75 to 107 cm.

- The minimum value has been recorded on the variety of **Floria** and was 71 cm.

And on peaches, average growth increase was calculated based on average values obtained from each variant during those two years. It was up to variants that have recorded the largest increases in height: **VT83A20** (28 cm), **VT84G20** (24 cm).

The other version of the recorded layer ranged from 17 to 21 cm. The smallest increases were recorded in the following: **Genetic Dwarf** (12 cm) and **Floria** (13 cm).

**Table 1. Tree growth in height in the years 2010 - 2011**

Variety or hybrid	No. of trees analyzed	Height of trees (cm)						Medium growth rate (Cm)
		2010			2011			
		The minimum (cm)	The maximum (cm)	The medium (cm)	The minimum (cm)	The maximum (cm)	The medium (cm)	
<b>Nectarines</b>								
Garden Beauty	3	54	68	62	65	87	78	16
VT84MR10P11	3	82	97	89	98	110	102	13
VT83B01	3	80	97	87	100	115	106	19
VT84N05	3	65	78	72	80	90	84	12
VT84N08	3	50	63	57	62	70	66	9
<b>The medium in nectarines</b>		<b>66.2</b>	<b>80.6</b>	<b>73.4</b>	<b>81</b>	<b>94.4</b>	<b>87.2</b>	<b>13.8</b>

<b>Peaches</b>								
Floria	3	54	62	58	68	75	71	13
Genetic Dwarf	3	60	67	63	75	75	75	12
Autumn	3	60	76	66	83	95	87	21
VT84G08	3	62	78	68	85	90	87	19
VT84G20	3	106	120	113	133	145	137	24
VT83A20	3	85	97	91	127	110	119	28
VT83AR18P4	2	80	100	90	95	120	107	17
<b>The medium in peaches</b>		<b>72.4</b>	<b>85.7</b>	<b>78.4</b>	<b>95.1</b>	<b>101.4</b>	<b>97.5</b>	<b>19.1</b>

#### Research on trunk growth

##### a) Increase in height

After analyzing the obtained data entered in the table 2 it finds the following:

✓ With nectarines, highest value occurred in version **VT83B01** (15 cm). The minimum was recorded on **VT84N08** **VT84N05** hybrids and was of 8 cm. The other variants values ranged from 10 to 11 cm.

✓ With peaches, maximum value reached 20 cm in hybrid **VT84G20**. The minimum was recorded at **Genetic Dwarf** varieties of only 10 cm. Other options have ranged between 11 to 17 cm.

Differences of trunk increase in the varieties and hybrids from the analysis shows that they fall into dwarf and semidwarf group.

##### b) Increase in thickness (diameter)

Analyzing data on table 3 on the trunk increase in diameter we found that:

✓ With nectarines largest increases in diameter were recorded on the hybrids **VT83B01** (68mm) and **VT84MR10P11** (65mm). Medium values were recorded on **Garden Beauty** (58 mm) and on the hybrid **VT84N05** (56 mm). The smallest increase in thickness occurred in hybrid **VT84N08** and was of 50 mm.

✓ With peaches, largest increase in diameter was recorded on hybrid **VT83A20** (73 mm). The minimum was recorded in variety **Floria** (52 mm). The other variants ranged from 54 to 66 mm.

Based on data collected during two years, the average gain in thickness of the trunk was calculated.

✓ With nectarines, largest increase occurred in hybrids **VT84MR10P11** (18mm) and **VT83B01** (17mm), and the smallest increase in hybrids and **VT84N08** and **VT84N05** (10mm).

✓ With peaches, largest increase was recorded in hybrid **VT84G08** (18 mm), the smallest increase was recorded on **Floria** (10 mm). The other variants recorded increases ranging from 14 to 17 mm.

**Table 2. Increase in trunk height (cm) in 2011**

Variety or hybrid	Number of trees analyzed	Trunk height (cm)		
		The minimum (Cm)	The maximum (Cm)	The medium (Cm)
Garden Beauty	3	5	15	10
VT84MR10P11	3	7	15	11
VT83B01	3	12	17	15
VT84N05	3	7	10	8
VT84N08	3	5	10	8
<i>The medium in nectarines</i>		<b>7.2</b>	<b>13.4</b>	<b>10.4</b>
Floria	3	8	13	11
Genetic Dwarf	3	8	10	10
Autumn	3	10	17	14
VT84G08	3	10	23	16
VT84C20	3	13	23	20
VT83A20	3	10	15	12
VT83AR18P4	2	15	18	17
<i>The medium on peaches</i>		<b>10.5</b>	<b>17</b>	<b>14.2</b>

**Table 3. Increase in trunk diameter (mm) in the years 2010 -2011**

Variety or hybrid	No. of analyzed trees	Trunk diameter (Mm)						Medium growth (Mm)
		2010			2011			
		The minimum	The maximum	The medium (mm)	The minimum	The maximum	The medium (mm)	
<b>Nectarines</b>								
Garden Beauty	3	38	48	44	48	65	58	14
VT84MRIO P11	3	41	56	47	58	73	65	18
VT83BOI	3	48	55	51	66	70	68	17
VT84N05	3	41	53	46	51	63	56	10
VT 84 N 08	3	30	45	40	40	60	50	10
<i>The medium in nectarines</i>		<b>39.6</b>	<b>51.4</b>	<b>45.6</b>	<b>52.6</b>	<b>66.2</b>	<b>59.4</b>	<b>13.8</b>
<b>Peaches</b>								
Floria	3	40	44	42	50	54	52	10
Genetic Dwarf	3	36	44	40	53	56	54	14
Autumn	3	36	50	44	58	62	60	16
VT84G08	3	40	56	48	52	78	66	18
VT 84 G 20	3	50	54	52	66	70	68	16
VT83A20	3	52	60	56	60	87	73	17
VT83AR18P4	2	36	56	46	58	68	63	17
<i>The medium in peaches</i>		<b>41.4</b>	<b>52</b>	<b>46.8</b>	<b>56.7</b>	<b>67.8</b>	<b>62.2</b>	<b>15.4</b>

**Table 4. Increasing in crown height in the years 2010-2011**

Variety or hybrid	No. of analyzed trees	Crown height (cm)						Medium growth (Cm)
		2010			2011			
		The min (cm)	The max (Cm)	The medium (cm)	The min (Cm)	The max (Cm)	The medium (cm)	
<b>Nectarines</b>								
Garden Beauty	3	50	60	55.5	60	72	68	12.5
VT84MR10P11	3	77	90	83	91	95	91	8
VT 83 B 01	3	74	87	79	88	98	91	12
VT84N05	3	61.5	72	65.5	73	80	76	10.5
VT 84 N 08	3	46	57	52	57	60	58	6
<i>Medium on nectarines</i>		<b>61.7</b>	<b>73.2</b>	<b>67</b>	<b>73.8</b>	<b>81</b>	<b>76.8</b>	<b>9.8</b>
<b>Peaches</b>								
Floria	3	50	54	52.5	60	62	60	7.5
Genetic Dwarf	3	55	60	57.5	67	65	65	7.5
Autumn	3	54	65	59	73	78	73	14
VT84G08	3	55	64	60.5	75	67	71	10.5
VT84G20	3	100	112	106	120	122	117	11
VT83A20	3	85	94	89.5	117	95	107	17.5
VT83AR18P4	2	72	86.5	81.5	80	102	90	8.5
<i>Medium on peaches</i>		<b>67.2</b>	<b>76.5</b>	<b>73.3</b>	<b>84.5</b>	<b>84.4</b>	<b>83.2</b>	<b>10.9</b>

**Table 5. Increasing in crown volume (m<sup>3</sup>) in the years 2010 - 2011**

Variety or hybrid	No. of analyzed trees	Crown volume (m <sup>3</sup> )								Me d. growth (m <sup>3</sup> )
		2010				2011				
		Med diam.1 of crown (cm)	Med diam.2 of crown (cm)	Average diam. of crown (cm)	Vol. of crown (m <sup>3</sup> )	Med diam.1 of crown (cm)	Med diam.2 of crown (cm)	Average Diam. of crown (cm)	Vol. of crown (m <sup>3</sup> )	
<b>Nectarines</b>										
Garden Beauty	3	60	53.32	57	0.30	93.3	83.33	88	0.33	0.32
VT84MRIO P11	3	9838	84.6	91	0.41	122.6	105	114	0.77	0.36
VT83BO1	3	103	98	101	0.52	135	129.3	132	1.2	0.68
VT 84 N 05	3	82.6	70	76	0.23	116.3	99	108	0.6	0.37
VT 84 N 08	3	50	45.2	48	0.06	74	67	71	0.22	0.16
<i>Medium on nectarines</i>		<b>78.8</b>	<b>70.2</b>	<b>74.4</b>	<b>0.26</b>	<b>108.2</b>	<b>96.72</b>	<b>102.6</b>	<b>0.63</b>	<b>0.36</b>
<b>Peaches</b>										
Floria	3	82.5	73.3	78	0.25	105	93.3	99	0.49	0.24
Genetic Dwarf	3	61.6	59	60	0.11	93.5	89.3	91	0.38	0.27
Autumn	3	83.5	75.5	78	0.25	105	95	100	0.52	0.27
VT84G08	3	90.6	76.6	84	0.31	118.3	100	109	0.66	0.35
VT 84 G 20	3	119.2	100.4	110	0.7	148.3	125	137	1.37	0.67
VT83A20	3	103.3	87.6	95	0.46	131.6	111.6	122	0.95	0.49
VT83AR18P4	2	97	74.3	86	0.33	124	95	110	0.7	0.37
<i>Medium on peaches</i>		<b>91.1</b>	<b>78.1</b>	<b>84.4</b>	<b>0.34</b>	<b>117.9</b>	<b>101.3</b>	<b>109.7</b>	<b>0.72</b>	<b>0.38</b>

#### 4. CONCLUSIONS

For nectarines the average growth rate was calculated, which is superior to high vigor variants : 19 and 13 cm, compared to the other variants.

The smallest increase was recorded on **VT84N08** version and was only 9 cm.

On peaches, the largest increases in height: **VT83A20** (28 cm), **VT84G20** (24 cm).

Differences of trunk increase in the varieties and hybrids from the analysis shows that they fall into dwarf and semidwarf group.

Based on data collected during two years, the average gain in thickness of the trunk was calculated.

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