Universitatea de Ştiinţe Agronomice şi Medicină Veterinară
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Varieties and Planting Systems Influence the Peach Tree Growth, Productivity and NPK Uptake

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Objectives

Comparison of the effect of different planting systems and organo-mineral fertilizers on the behaviour of some new peach tree varieties under the conditions of the Romanian Plain.

V planting system

Tatura trellis

Material and method

- 5 peach varieties: Royal Estate, Earlirich, October Star, Late Luka, Rubirich
- 1 rootstock: GF 677
- 4 planting systems: Tatura Trellis, V planting system, Sibari Y and Vertical Axe

Planting distances:

- Tatura trellis (5.0 x 1.0 m)
- V planting system (5.0 x 1.5 m)
- Sibari Y (4.5 x 1.5 m)
- Vertical Axe (4.0 x 1.5 m)

Sibari Y

Material and method

Fertilization:

- 8 – 10 weeks after blooming
- Fertisol C-011 (0 g/l N; 1.20 g/l P_2O_5; 1.20 g/l K_2O)
- Fertiplant 411 (1.80 g/l N; 0.35 g/l P_2O_5; 0.40 g/l K_2O + Vitamin C)

Biometric measurements:

- trunk diameter;
- annual branches number and length;
- annual branches typology.

Material and method

Determinations:

-leaves macroelements content (10 days after fertilization) :

-Wet mineralization – Hach Digesdahl method for total forms of the macroelements;

Macroelements dosage:

- Kjeldahl method for nitrogen determination;
- spectrophotometric method for phosphorus;
- flam photometry for potassium.

- **Analysis of variance** - Student test

Results and discussion

Total number and length of peach tree shoots in the Tatura trellis training system

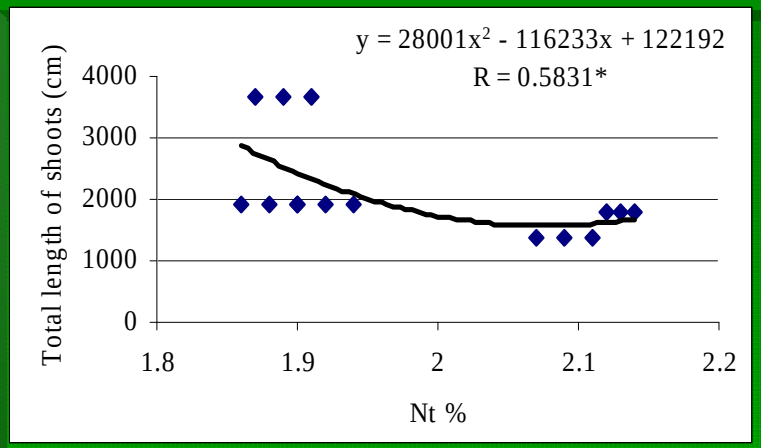
Variety	'Royal Estate'		'Earlirich'		'October star'		'Late Luka'		'Rubirich'	
Year	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Number of shoots/tree	99	168	58	100	88	112	75	92	140	152
Total shoots length (cm)	1809	1770	1916	1543	1917	1450	1372	1079	3662	2400

In 2010 the number of fruit shoots was lower than in 2011 year in all varieties examined, while their total length values decreased significantly in the second year.

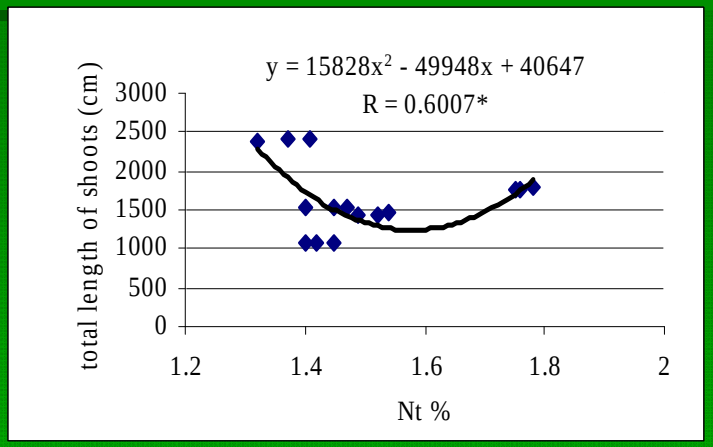
Results and discussion

Correlation between Nt content,% of peach shoots and total shoots length

2010



2011



The calculated correlation coefficients indicate a significant correlation between the Nt content of peach shoots and their length in 2010 and 2011

Results and discussion

Number of fruit buds per unit trunk surface section

Productivity index: ratio between flower buds number and trunk sectional area

Canopy	Fruit buds number/ trunk section area				
Variety	Royal Estate	Earlirich	October Star	Late Luka	Rubirich
Tatura trellis	62.63	39.73	27.89	47.15	77.20
V planting system	41.06	210.00	169.7	118.24	288.98
Sibari Y	52.42	40.63	147.98	128.92	177.93
Vertical Axe	77.27	20.89	130.50	71.42	314.76

Significant differences between different canopies - the most representative being V planting system, due to the highest tree density

T productivity index was significantly different among cultivars. 'Rubirich' recorded the highest productivity index values in all four training systems.

Results and discussion

Chemical composition of peach leaves

Accumulation of NPK macro-elements - total forms (%) in leaves ten days after the fertilization for peach varieties grown in Tatura trellis training system

	Royal Estate		Earlirich		October Star		Late Luka		Rubirich	
%	2010	2011	2010	2011	2010	2011	2010	2011	2010	2011
Nt	3.26	2.36	3.29	2.60	3.37	2.56	3.01	2.34	3.39	2.75
Pt	0.674	0.353	0.696	0.535	0.65	0.430	0.510	0.292	0.646	0.580
Kt	1.45	1.81	1.80	2.00	1.60	1.50	1.50	1.45	1.65	2.10

The leaves content in Nt (%) obtained was placed in the normal supply (3.0 to 3.5% Nt) in 2010 and low supply in 2011

The leaves content in Pt (%) obtained was placed in the high supply (>0.40% Pt) in 2010 and 2011

The leaves content in Kt (%) obtained was placed in a low supply (1.1- 2.0% Kt) in 2010 and 2011

Results and discussion

The analysis of variance of total NPK accumulation in leaves

The influence of ***planting system (a factor)*** and variety (b factor) on the accumulation of Nt (%) in peach leaves

a/b Nt in leaves	'Royal Estate'	'Earlirich'	'October Star'	'Late Luka'	'Rubirich'
Tatura trellis	a2.36c	a2.60b	b2.56b	b2.34c	b2.75a
V planting syst.	a2.38b	b2.34c	a2.73b	b2.35c	a2.88a
Sibari Y	a2.45b	a2.56a	a2.61a	b2.41b	c2.53a
Vertical Axe	a2.33c	b2.42c	c2.37c	a2.63b	a2.84a
	B constant A variable: Dl 5%=0.12*% N; Dl 1%=0.17 % N; Dl 0,1%=0.24 % N A constant B variable: Dl 5%=0.13*% N; Dl 1%=0.18 % N; Dl 0,1%=0.23% N				

There were made interpretations by Dl 5% indicated in the table by *

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V planting system	a2.38b	b2.34c	a2.73b	b2.35c	a2.88a
Sibari Y	a2.45b	a2.56a	a2.61a	b2.41b	c2.53a
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For Tatura trellis the highest Nt content in leaves is recorded for 'Rubirich'
For Vertical Axe, 'Rubirich' recorded also the highest values □□of nitrogen content
For Sibari Y the highest values were for 'October Star' and 'Earlirich'
For V planting system the largest accumulation in total N was recorded for 'Rubirich'

Results and discussion

The influence of ***planting system (a factor)*** and variety (b factor) on the accumulation of Pt (%) in peach leaves

a/b Pt in leaves	'Royal Estate'	'Earlirich'	'October Star'	'Late Luka'	'Rubirich'
Tatura trellis	c0.353c	a0.535a	a0.430b	c0.292d	a0.580a
V planting system	a0.505a	a0.522a	a0.410c	a0.459b	c0.334d
Sibari Y	c0.370a	b0.353a	a0.386a	b0.344a	c0.322b
Vertical Axe	b0.417b	b0.325c	a0.402b	a0.498a	b0.381b

In the four the planting systems show significant differences.

B constant A variable: Dl 5%=0.044*% P; Dl 1%=0.059 % P; Dl 0,1%=0.081 % P

For 'Royal Estate' variety the highest values are obtained on V planting system with significant differences compared to the other planting systems.

A constant B variable: Dl 5%=0.047*% P; Dl 1%=0.063 % P; Dl 0,1%=0.084% P

For 'Earlirich' there were more classes of value:
A Tatura Trellis and V system
B - Sibari Y and Vertical Axe

For 'October Star' there were no significant differences in Pt accumulation in leaves

For 'Late Luka':
The highest values of Pt accumulations in leaves - Vertical Axe and V planting system,

For 'Rubirich' there were significant differences.

Results and discussion

The influence of planting system (a factor) and *variety (b factor)* on the accumulation of Pt (%) in peach leaves

a/b Pt in leaves	'Royal Estate'	'Earliric h'	'October Star'	'Late Luka'	'Rubirich '
Tatura trellis	c0.353c	a0.535a	a0.430b	c0.292d	a0.580a
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The planting system recommended in the case of accumulation of nutrients, namely phosphorus was Tatura trellis .

There were made interpretations by Dl 5% indicated in the table by *

Results and discussion

The influence of planting system (a factor) and variety (b factor) on the accumulation of Kt (%) in peach leaves

a/b Pt in leaves	'Royal Estate'	'Earlirich'	'October Star'	'Late Luka'	'Rubirich'
Tatura trellis	a1.81c	a2.00b	a1.50d	b1.45d	a2.10a
V planting system	a1.89a	b1.71b	b1.33c	a1.70b	b1.87a
Sibari Y	c1.16c	c1.50a	a1.55a	c1.30b	c1.34b
Vertical Axe	b1.80a	b1.65b	b1.36c	a1.67b	c1.38c
a/b Pt in shoots	B constant A variable: Dl 5%=0.08*% K; Dl 1%=0.11 % K; Dl 0,1%=0.16% K A constant B variable: Dl 5%=0.07*% K; Dl 1%=0.10 % K; Dl 0,1%=0.13% K				

For 'Royal Estate': High values - V planting system and Tatura trellis planting system.

For 'October Star' - significant differences in Kt accumulation given by the planting system:

Highest content - Sibari Y system

For 'Late Luka': Highest values - V planting system and Vertical Axe

Results and discussion

The influence of planting system (a factor) and variety (b factor) on the accumulation of Kt (%) in peach leaves

For ‘Royal Estate’:
High values - V planting system and Tatura trellis planting system.

For ‘October Star’ -significant differences in Kt accumulation given by the planting system:
Highest content - Sibari Y system

For ‘Late Luka’:
Highest values - V planting system and Vertical Axe

Conclusions

- N content was framed in a normal supply, the P content in a high supply, while K was in small amounts
- Number of fruit branches increased significantly in 2011, due to both fertilization and pruning carried out in spring and summer

-The root fertilization is important but it is necessary to be supplemented by foliar fertilization in order to create a balance between N, P and K plant content during the

‘Rubirich’

‘Royal Estate’

Conclusions

-In terms of productivity index expressed by the number of fruit buds per unit of trunk surface section, ‘Rubirich’ recorded highest values in all four planting systems, Tatura trellis, V system, Sibari Y and Vertical Axe

-The root fertilization is important but it is necessary to be supplemented by foliar fertilization in order to create a balance between N, P and K plant content during the vegetation period

‘Earlirich’

‘Royal Estate’

‘Rubirich’

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Thank you!