Research Paper Agricultural Science

The Influence of A Crown Type of the Volume Growth tf the Surface Leaf From Different Species

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ABSTRACT

The present paper presents research results concerning the behaviour of some fruit tree and shrub species guided in art canopy systems. Research was carried out at the Didactic Station of the B.U.A.S.V.M. Timisoara, Romania. On the experimental plot, we studied two cultivars of apple tree Generos and Florina which were conducted in systems crown Cordon vertical simple `U", `U" double palmettes chandelier 6 arms and Belgian Fence System crown. The research had several objectives: influence of canopy system, cultivar, and climate conditions on foliar area in apple tree and influence of canopy system, cultivar, and climate conditions on canopy volume in apple tree. The modern conception concerning, tree felling, expected some new principles in order to raise the efficiency of the production of fruit plantations. These principles are also based on a greater understanding of the biology of trees and shrubs, the most important being: reducing the volume of the crown, especially its height, for ease of maintenance enforcement, harvest, etc..; the adaptation of forms of crowns (like the flattened), allowing production mechanization of production; speeding up the training period of fruit trees. After studying and analyzing experimental results have formed a number of conclusions and recommendations whose content is the response to targets.

KEYWORDS fruit trees, landscape, apple, crown, variey.

INTRODUCTION

Biological material used

The description of Generous variety

Variety originally from Romania. Obtained from S.C.P.P. Voineşti and approved as a new variety in 1983. Genitors (Parmaind `or x M. Kaido) x (Jonathan x H53-39-2) x Beautiful Voineşti [1].

Fruits are large (160-200g), slightly flattened spherical shape, slightly asymmetrical, yellow-green background color and the ruby-red cover, two thirds of the surface, with more wax. Flesh firm, moderately juicy, aromatic and pleasant tasting [4].

The description of Florina variety

It is a variety obtained from resort Angers in France and placed in culture in 1977, and licensed and authorized for production in our country in 1993 [2].

Jonathan variety resulting from crossing a complex hybrid (621-1) carrying the Vf resistance gene inherited from malus floribunda 821 [5]

Operations of changing the position of growth branches and the shoots

The operation of attachment of the branches.

- fixing branches in the desired position was made by binding them from trellis wires.

Operations for forming a branch

- this type of operation were carried out on the top the branches in order to foster growth in length, they were brought to almost vertical position.

Operations of bending the branches

- arms bending operation was performed in the system tree crown palmetto led chandelier with six arms, in order to maintain as equal the lengths of arms.

Proper cutting operations

Operations training of the trunk

Beginning in year two, depending on the system of crown adopted for each tree were executed shortening the shaft with intent to ramification, and total removal of annual branches, being too dense.

Operations of branches shortness

Shortening the branches, for ramification at the "U" double was short, removing about one third of the length of each arm, above the two closest and opposite buds. Shortening annual branches was made 2-3 mm above a vegetative bud, the cut is little oblique.

Operations of branches notching

Notching is surgery that cut into the bark and some wood, made crescent shaped above a bud sleeping, to his awakening.

Working method concerning the growth and training crowns of, fruit trees directed on different systems until the desired shape is obtain

Working method for management of apple tree varieties in vertical cordon crown system

Planting distances were established between the rods in place of 80 cm and 300 cm between rows. Immediately after planting trees have been shortened to the height of 60 cm, to form the trunk. Vertical cord is the best and most used, because it corresponds to the natural tendency of growth of the tree [3].

At planting, each rod was shortened to a height of 60 cm, to form the trunk, above the two closest buds and in the coming years aiming at shortening the shaft generally, for his thickening, shortening that makes the one hand and sides of the shaft opposite each year, to balance it.

During the growing season, starting in 2nd year after planting, the trees were also carried out shortening the shaft, about 30-40 cm, until the cord has reached 2.5 m height. These operations shortening the shaft annually are necessary to fill him with semischelet branches and fruit.

Working method for management ofapple tree varieties in "U" simple crown system
Technical training consists of planting trees, after which it was shortened to form the trunk, 60-75 cm tall, above 2 buds oriented on the row.

Of the two buds appeared in the first year one branch, which at the length of 50-60 cm was bent, and are directed vertically. For a higher aesthetic value, bends arms were made equal in both arms taking care to be as short.

The two arms were followed during the training to be balanced, so over the coming years if one of them got taller, bowed tip will return to its normal position when their lengths reached full size approximately equal.

Working method for management of apple tree varieties in "U" double crown system
At planting, trees were shortened to a dwarf trunk, 40-50 cm above the two buds oriented on the same row. In the spring of the 2nd year, 2 arms have been shortened to 30 cm above the the trunk of is bifurcation 2 that shoots resulting from the other two branches each, they were originally conducted in a horizontal position and at the length of 40 cm was bent into an upright position, one by one based on the growth achieved.

In subsequent years will follow the technical operations generally keeping a balance between the arms, but also perform operations to shorten the arms extensions of 30 to 40 cm, for better filling of fruit branches until it reaches the desired height.

Working method for management of apple tree varieties in palm chandelier whit 6 arms crown system
For training system palmettes crown chandelier with six arms, trees were planted at least 3.5 meters and 3.5 meters between rows. The height of the trees have been shortened for the formation of the trunk is 40-50 cm above the two buds oriented on the same row.

These shoots were driven horizontally in the direction of the row, keeping them always top of obliquely inclined to a more rapid lengthening.

The forming operations have been performed during this period were followed to obtain a 150 cm length of the scaffold, in order to maintain a distance of about 40 cm between the legs of which will later form.

Working method for management of apple tree varieties in Belgian fence crown system
In this system, the structures of each tree will interbreed with other trees in structures neighbors, taking the form of rhombs.

The trees were planted at a distance of 80 cm at a time, and 3.5 m between rows. Shortening was done immediately after planting trees at a high trunk from 60 to 65 cm above 2 buds and lay opposite the direction of the row.

In the first year of growing shoots on the trunk is deleted, keeping only the two shoots that form as a "V" with the help of straight slats.

In the spring of the 2nd year, the arms were shortened for better garnishing. During the growing season were also executed and operations shoots shortening and pinch a few leaves.

CASE STUDY
A. Data relating the influence of the crown on the leaf surface in some apple varieties
With regard to the effect of the system on the crown surface of the leaf were recorded values between 4708 cm^2 at the "U" double fence system 9375 cm^2 Belgium.

With regard to the effect of crown system as in Table 5.35 were recorded positive significant differences at all the crown to the "U" simple, except vertical cordon system.

Apple cultivar Florina values recorded by crown shape were between 4264 cm^2 respectively vertical cordon system 4278 at the "U" double and 8560 cm^2 at 5494 cm^2 respectively Belgian Fence system at system palmetto chandelier with six arms. Differences were significantly positive in most varieties except at systems have "U" simple and vertical cord where there were negative differences.

TABLE 1
The effect of crown system on leaf area at apple tree

Crown Systems	Leaf area (cm^2)		Values relative (%)	Difference / significance
U simple – Cordon vertical	5241	4865	107,73	376**
"U" double – Cordon vertical	4708	4865	96,77	-157
Palmetto chand. 6 arms – Cordon vertical	6138	4865	126,17	1273***
Belgian fence – Cordon vertical	9375	4865	192,70	4510***
"U" double – U simple	4708	5241	89,83	-533000
Palmetto chand. 6 arms– U simple	6138	5241	117,12	897***
Belgian fence – U simple	9375	5241	178,88	4134***
Palmetto chand. 6 arms – "U" double	6138	4708	130,37	1430***
Belgian fence – "U" double	9375	4708	199,13	4667***
Belgian fence – Palmetto chand. 6 arms	9375	6138	152,74	3237***

DL5%=224 cm^2 DL1%=32526 cm^2 DL0,1%=489 cm^2

On the basis of unilateral effects of variety in this period were recorded values of leaf area between 5410 cm^2 at 6721 cm^2 Florina and generous variety. There were significant negative differences of the two varieties of the average experience.

From the point of view of the influence of the crown on apple leaf area values were recorded between 5466 cm^2 to "double U" and 10019 cm^2 at the "Belgian fence" variety in general, and at recorded values were Florina between 4260 $cm2^2$ at 8560 cm^2 system Cordon Fence Belgian vertically with an amplitude of 4725 cm^2 and 4264 cm^2 generous variety at Florina.

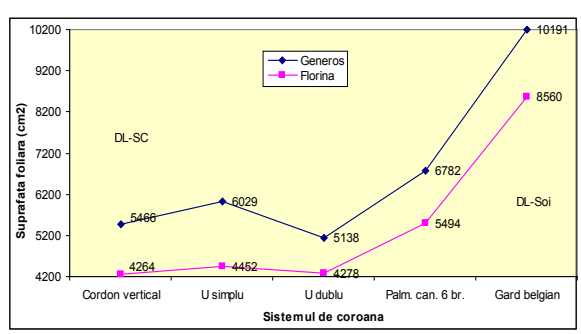

Fig. 1: Leaf area of apple varieties for different crown systems

Generous apple variety using different crown systems afforded a leaf area between 5138 cm² at the "U" that double vertical cordon system 5466 cm² and 10191 cm² at 6782 cm² respectively Belgian Fence system at system palmetto chandelier with six arms .

The differences from the average varieties were significantly positive in most varieties except at the "U" simple and vertical cord system where there were negative differences.

TABLE 2
The effect of crown system on leaf area at studied apple varieties

Crown Systems x Generos	Leaf area (cm²)		Values relative (%)	Difference / significance
U simple – Cordon vertical	6029	5466	110,30	563***
"U" double – Cordon vertical	5138	5466	94,00	-328⁰
Palmetto chandelier with six arms. – Cordon vertical	6782	5466	124,08	1316***
Belgian fence – Cordon vertical	10191	5466	186,44	4725***
"U" double – U simple	5138	6029	85,22	-891⁰⁰⁰
Palmetto chandelier with six arms– U simple	6782	6029	112,49	753***
Belgian fence – U simple	10191	6029	169,03	4162***
Palmetto chandelier with six arms – "U" double	6782	5138	132,00	1644***
Belgian fence – "U" double	10191	5138	198,35	5053***
Belgian fence – Palmetto chandelier with six arms	10191	6782	150,27	3409***
Crown Systems x Florina	Leaf area (cm²)		Values relative (%)	Difference / significance
U simple – Cordon vertical	4452	4264	104,41	188
"U" double – Cordon vertical	4278	4264	100,33	14
Palmetto chandelier with six arms. – Cordon vertical	5494	4264	128,85	1230***
Belgian fence – Cordon vertical	8560	4264	200,75	4296***
"U" double – U simple	4278	4452	96,09	-174
Palmetto chandelier with six arms– U simple	5494	4452	123,41	1042***
Belgian fence – U simple	8560	4452	192,27	4108***
Palmetto chandelier with six arms – "U" double	5494	4278	128,42	1216***
Belgian fence – "U" double	8560	4278	200,09	4282***
Belgian fence – Palmetto chandelier with six arms	8560	5494	155,81	3066***

DL5%=248 cm² DL1%=344 cm² DL0,1%=478 cm²

The variety Florina, type of crown effect on the leaf area recorded values from 4264 cm² at 8560 cm² system vertical Cordon Fence Belgian system.

The variety Generous values recorded were between 5138 cm² at the "U" double and 10191 cm² Belgian Fence system. The differences from the average experience was very significantly negative in all varieties.

B. Data on the influence of the crown on the crown volume of some apple varieties

From this table shows that crown volume recorded low values at all systems wreath from 1.04 m³ at 1.40 m³ vertical cordon system at system palmetto chandelier with six arms. Differences are significantly positive at 6 arm chandelier palmetto and Belgian fence significantly distinct "U" double.

At the variety, Florina were there significant positive differences at system palmettes crown chandelier with six arms, significantly distinct positive corona system significantly positive vertical Cordon Fence systems Belgian crown "U" simple "U" double.

TABLE 3
The effect of crown system on crown volume at different apple trees varieties

Crown Systems	Leaf area (cm²)		Values relative (%)	Difference / significance
U simple – Cordon vertical	1,09	1,04	105,50	0,06
"U" double – Cordon vertical	1,17	1,04	113,13	0,14*
Palmetto chandelier with six arms. – Cordon vertical	1,40	1,04	135,04	0,36***
Belgian fence – Cordon vertical	1,30	1,04	125,29	0,26***
"U" double – U simple	1,17	1,09	107,23	0,08
Palmetto chandelier with six arms– U simple	1,40	1,09	128,00	0,31***
Belgian fence – U simple	1,30	1,09	118,76	0,21**
Palmetto chand. 6 arms – "U" double	1,40	1,17	119,37	0,23**
Belgian fence – "U" double	1,30	1,17	110,75	0,13*
Belgian fence – Palmetto chand. 6 arms	1,30	1,40	92,78	-0,10

DL5%=0,11 m³ DL1%=0,16 m³ DL0,1%=0,24 m³

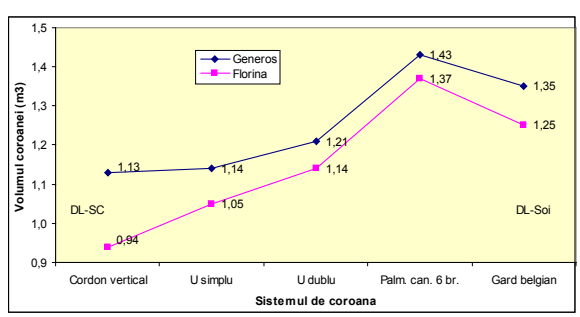

Fig. 2: Crown volume of apple varieties for different crown systems

According the date from the table, the values Generous variety were very close to each other, so at Florina. There were significant differences crown positive systems "U" simple "U" twice, and the rest have not been generous Variety meanings.

TABLE 4
The effect of crown system on crown volume at studied apple varieties

Crown Systems x Generos	Leaf area (cm^2)		Values relative (%)	Difference / significance
U simple – Cordon vertical	1,14	1,13	100,88	0,01
"U" double – Cordon vertical	1,21	1,13	107,08	0,08
Palmetto chand. 6 arms Cordon vertical	1,43	1,13	126,55	0,30**
Belgian fence – Cordon vertical	1,35	1,13	119,47	0,22*
"U" double – U simple	1,21	1,14	106,14	0,07
Palmetto chand. 6 arms – U simple	1,43	1,14	125,44	0,29**
Belgian fence – U simple	1,35	1,14	118,42	0,21*
Palmetto chand. 6 arms – "U" double	1,43	1,21	118,18	0,22*
Belgian fence – "U" double	1,35	1,21	111,57	0,14
Belgian fence – Palmetto chand. 6 arms	1,35	1,43	94,41	-0,08
Crown Systems x Florina	Leaf area (cm^2)		Values relative (%)	Difference / significance
U simple – Cordon vertical	1,05	0,94	111,70	0,11
"U" double – Cordon vertical	1,14	0,94	121,28	0,20*
Palmetto chand. 6 arms – Cordon vertical	1,37	0,94	145,74	0,43***
v – Cordon vertical	1,25	0,94	132,98	0,31**
"U" double – U simple	1,14	1,05	108,57	0,09
Palmetto chandelier with six arms– U simple	1,37	1,05	130,48	0,32**
Belgian fence – U simple	1,25	1,05	119,05	0,20*
Palmetto chand. 6 arms – "U" double	1,37	1,14	120,18	0,23*
Belgian fence – "U" double	1,25	1,14	109,65	0,11
Belgian fence – Palmetto chand. 6 arms	1,25	1,37	91,24	-0,12

DL5%=0,19 m^3 DL1%=0,26 m^3 DL0,1%=0,36 m^3

CONCLUSIONS

From the point of view of the influence of the crown on apple leaf area values were recorded between 5466 cm^2 to "double U" and 10019 cm^2 at the "Belgian fence" variety in general, and at recorded values were Florina between 4260 cm^2 at 8560 cm^2 system Cordon Fence Belgian vertically with an amplitude of 4725 cm^2 and 4264 cm^2 generous variety at Florina.

At the variety of apple Generos, the use of different systems allowed to obtain a crown between 5138 cm^2 leaf area at the "U" that double vertical cordon system 5466 cm^2 and 10191 cm^2 at 6782 cm^2 respectively Belgian Fence system at system palmetto chandelier 6 fathoms.

At the variety of apple Florina values recorded by crown shape were between 4264 cm^2 respectively vertical cordon system 4278 at the "U" double and 8560 cm^2 at 5494 cm^2 respectively Belgian Fence system at system palmetto chandelier with six arms.

At the variety, Florina, crown type effect on the leaf area recorded values from 4264 cm^2 at 8560 cm^2 system vertical Cordon Fence Belgian system.

The variety Generous values recorded were between 5138 cm^2 at the "U" double and 10191 cm^2 Belgian Fence system.

Regarding crown volume was very low values recorded from one year to another very significant positive differences from the average.

At the variety generated the lowest values were recorded crown systems "vertical Cordon 1.13 m^3 and" U "just 1.14 m^3, typical" U "dual 1.21 m^3, and the highest values systems palmettes crown chandelier 6 arms Belgian Fence m3respectiv 1.43 1.25 m^3.

According the data from the table, the variety Generous values were very close to each other, so at Florina.

At the variety, Florina crown volume increased progressively from 0.95 m^3 in 3rd to 1.44 m^3 in 5th. At the variety generated as progressive growth was 1.05 in the 3 m^3 to 1.34 m^3 in her 5th.

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