

THE INFLUENCE OF THE TREE AXIAL SHAPE WITH HANGING BRANCHES UPON THE QUANTITY AND QUALITY OF THE APPLE PRODUCTION

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Abstract

Tree axial shape with hanging branches formation is formed easily. It is based in a vertical axis which is let grow straight, with branches in a spiral formation that are bended with an angle more than 90°. The Internodes make the branches that are above the leader branch easier living a distance of 25-30 cm distance. Their bending is realized with wire hooks. The trees take an umbrella shape making, therefore allowing more trees for a given area. From the physiological point of view the crown shape is based in the effect that branch angle formation has on the tree and fruit growth. In the crown formation we don't use branch cuts, but just thinning and bending on the branches.

The positioning of the branches with an angle greater than 90° gives priority to the fruit growth rather than the tree growth. For this reason the trees enter production in their second year, have higher consistency in production, therefore increasing significantly the economic profits.

Key words: tree garland, axial shape, apple tree, fruit, experiment, hanging branches

1. INTRODUCTION

The development of the fruit culture is determined to be a priority in Albanian Government policy for Agriculture. This is closely related to the climatic conditions, which are very favorable for this sector, the highest returns for area unit, the competitiveness ability in the market because of the quality achievement and the existence of available argo-processors for this industry.

The integration of Albania in the European Union it bringing in a steady pace the opening of the new markets, as a result a high degree of competition comes from the apple producers in the region.

Up to the 1990 the apple production was base on old technology and schemes which included.

1. Sub-varieties dorm seeds
2. A higher distance between the trees (150-200 trees/Ha)
3. They were mainly located in hills with limited possibilities of irrigation and not accessible to machineries
4. The main form of crown shape was cupola
5. More attention was given to the form with short pruning.

With the introduction of the new sub-varieties, the new grafting techniques, the use of flat lands, the new agro-machinery this sector has been revolutionized in Albania, producing 7-10 times more than in 1990.

The main changes have been achieved from the crown shape and form. The main shape used from the growers is that of a pyramid with layers over the vegetative sub varieties MM 106, with less classical pelmet with a supporting system (such sub varieties are, EM 9, Pazhamat etc.)

A new more modern shape is introduced with the axial shape and form that has hanging branches. This study aim to prove and identify the superiority of this form over the one currently used in the region as well as explain its technique.

This study was conducted during 2006-2009 in the region of Korca, the development of the apple growing in the region of Korca is consider to be a priority for the Ministry of Agriculture. Today in Korca region are cultivated more than 2800 ha of apples. The support in subsidies in apple growers and more specifically for, new growers, drip irrigation, the opening of new wells for irrigation and the government grants for the supporting agro processing industry in this sector has lead to

planting of 300 ha of apples on average every year.

There is a new study done from the government which the main objective is that in the coming years the area planted with apples to be enlarged with another 5000 ha. Considering this policy and study by the government we need to focus that the investment will be used as efficient as possible by introducing new forms and sub-varieties, new techniques and more modern practices. The experience and knowledge that our farmers and specialists have in this fields are limited. Every step taken given the current level of knowledge needs more experimenting to improve the new practices, as well as introduce new methodology and techniques. . it has been clearer that the improvement in the quality of apple fruits is crucial for the competitiveness and the income level that most of the local farmers in the region of Korca are depended, as well as entering of new markets by this farmers.

2. MATERIALS AND METHODS

This study is focused in two main directions.

1. The analyses of the comparative experimental data between the traditional crown form (pyramidal with layers) and the new axial form with hanging branches.

The experiment was done in Dvoran in Korca Region. This region is typical for apple growing in an altitude 850 m above sea level.

The apple orchard is in full production with fully developed crowns. In the experiment this varieties were used.

V1 – pyramidal form with four sub varieties MM 106 with planting distances 4m x 2.5m

V2- pyramidal form with four sub varieties EM 9 with planting distance 4m x 1m

V3- axial form with hanging branches sub-varieties EM 9 with planting distance 4m x 1m

The variants in the study were planted in an 20 m² area, the number of the plants for each variant.

V1- 2 plants

V2- 5 plants

V3- 5 plants

All the agro-technical treatment were done in the exactly the same for all. A careful consideration was taken for phonological phases and the other land parameters.

The production harvested according to the treatments was standardized and valued by the market prices.

2. Model orchards were build for demonstration purposes, with the given axial form with hanging branches scheme.

3. RESULTS AND DISCUSSION

After collection of the data for a period of three years statistical analyses was done. The statistical analyses is of great importance for the fact that shows the aspects of each cultivar and sub-cultivar. The statistical analyses of a randomized split plot let us show not only the studied feature (the crown form) but also other features that are taken in the study.

The average production according to plots is given in the table 1.

Tab. 1. Avarage production for cultivars

Cultivars	P1	P2	P3	Total	Average
V1	58	51	53	162	54
V2	75	62	73	210	70
V3	95	85	90	270	90
Total	228	198	216	642	
Avarage	76	66	82		214

Production kg /plant

The production yields of every plot is weighted and than an average is for plant is taken. The taken data are given in the table 2 .

Tab.2. Production kg /plant

Nr	Cultivars	Kg/Plant	% compared with V1
1	V1	27	100
2	V2	14	51.9
3	V3	18	66.7

The data in the table 1 were undergone variance analyses between the cultivar was highly significant (P= 0.01)

The number of plants/ha

The axial shape with hanging branches has a positive effect with the increase of plant numbers for ha. This in a correlated analyses brings a increase in leave are indicator. This indicator is very important for the production of plants per ha. The data are given in Table 3.

Tab.3. Number of plants/ha

Nr	Cultivars	Number of plants/ha	% compared with V1
1	V1	1000	100
2	V2	2500	250
3	V3	2500	250

Fruit weight

The second parameter is calculated by taking samples from every scenario.

Average fruit weight – sample weight / Nr. Of
The data shows that the axial form has a positive effect in increasing the fruit weight. The data are presented in Table 4.

Tab.4 Average fruit weight

Nr	Cultivars	Fruit weight in gr	% compared with V1
1	V1	151	100
2	V2	158	104.6
3	V3	165	109.3

Production kv/ha

Production kv/ha is calculated:

Production plant per plant x number of plants/ha = production ha

Based on the variance analyses of the scenarios we can say that the axial form increases production up to 66.7% more that the traditional form (pyramidal form) with significance P= 0.001

Data are shown in table 5

Tab.5 Yield Production kv/ha

Nr	Cultivars	Production kv/ha	% compeered with V1
1	V1	270	100
2	V2	350	129.6
3	V3	450	166.7

Analysis of economical effectiveness of the study

The economical indicator is the most important factor given the situation in Albania. The gross income/ 000 lek per ha is calculated based on the production kv/ha and the price lek kg according to the scenarios.

The net income is calculated as the difference of the gross income minus the expenses done for each scenario. The axial form increases the net income per ha up to 80% from the traditional form (pyramidal form)

This data are presented in table 6.

Tab.6 Analysis of economical effectiveness of the study

Nr	Cultivars	Production kv/ha	Price lek/kg	Gross income/000 lek	Net income /000 lek	% compared with V1
1	V1	270	45	1215	590	100
2	V2	350	47	1645	845	143
3	V3	450	49	2205	1062	180

4. CONCLUSIONS

The effect of the form of the crown brings highly statistical proven differences. The best statistically proven scenario is the one of the axial form with hanging branches. This form brings production increase of 29% compared to the pyramidal form with the sub-cultivar EM 9 and 67% with pyramidal with sub cultivar MM 106. The net income value for ha is 80% higher than the traditional cultivar. The extra expenses of 8000 \$ for ha in the traditional form are justified in the new form and are covered by the first year of production. The number of the plants per area unit are increased three times,

they cut in the production earlier in the second year. We can have yearly production. Better fruit quality. This form can be used in the sub cultivars this week growth like EM 9

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