

Developing a sustainable viticulture by SAPARD Program

(SUMMARY)

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Obtaining a high quality of grape and wine production, with maximum economic efficiency in the context of sustainable viticulture practice, landscape (environment) improvement and rural development, involves the knowledge of relationships between environment, climate / soil system and vine.

The grape, raw material for producing wine, is the result of varieties biological and hereditary traits valorification, equally by the man-made culture conditions.

This paper, entitled "Developing a sustainable viticulture by SAPARD program", aims to bring new information on the quality and quantity of grapes, raw material for producing wine (Crâmpoșie selecționată and Tămâioasă românească varieties) or for fresh consumption (Victoria variety), made in the context of a sustainable viticulture, as a result of the implementation of the measures proposed by SAPARD program in the vineyard center Dragasani and other vineyard centers of Oltenia, by companies that develop activities on the vine cultivation. All the firms receiving funding through SAPARD program, chose to make performance which was seen in the adopted solutions for the achievement of multiple technological segments, but also for the acquisition of materials for the finalization of the investment: land preparation for planting, choosing wine-growing seedling for planting, the support system and also the equipments to perform work in the plantation. The majority of projects (those implemented at SC Domeniul Coroanei Segarcea SRL, SC Cervina SRL, SC Viticola Corcova SRL, SC AX SRL Dragasani) have targeted the investment to the establishment of new plantations with noble varieties endowed with valuable traits in terms of quantitative and qualitative potential. These new plantations have replaced aged vine plantations, with low productivity and efficiency, which have reached the age permitted by the applicable law to be cleared. As a general rule, valid for all those who have established plantations with vinifera varieties is that they succeeded in the third or even second year of life, to have vine plantations without gaps (maximum density), without impurities, with homogeneous vigor of vine stocks and high, constant, uniform fertility.

SAPARD program was designed to financially support rural development and agriculture so that, after the integration, candidate countries from Central and Eastern Europe be economically prepared in order to participate to the Common Agricultural Policy, but especially to be able to easily adapt to the European structures specific way of work.

Designed with several chapters, the paper comprises two parts. The first part consists of 4 chapters and presents documentary information. The second part includes a single chapter with the results obtained during the research. The study ends with conclusions and recommendations to wine-growers. The presentation of the work has 209 pages and contains 105 tables, 9 graphics, 6 maps. The consulted bibliography includes 70 papers published in our country and abroad, by Romanian and foreign authors.

The approached thematic has a technological character, having as major objective the improvement of some technological sequences previously used in the wine-growing practice for the sustainable development of Dragasani vineyard center viticulture and aims to bring new information on the quality and quantity of grapes, raw material for producing wine (Crâmpoșie selecționată and Tămâioasă românească varieties) or for fresh consumption (Victoria variety), made in the context of a sustainable viticulture, as a result of the implementation of the measures proposed by the SAPARD program.

Therefore, researches have focused on the following:

- Assessing ecoclimatical resources of the experimental device,
- Assessing ecopedological resources of the experimental device,
- Assessing biological resources (vinifera biosystem/ rootstock) under the variability of technological factors (planting distances, training technique, fruit load)
- Evaluation and optimization of the approached technological factors in accordance with the biological-climatic-pedological resources, of the mentioned wine-growing area with qualitative vocation.

Vinifera varieties that were studied belong to table grapes varieties (Victoria variety), for dry white wines (Crâmpoșie selecționată variety) and for aromatic semisweet-sweet white wines (Tămâioasă românească 104 Dg variety). Vinifera varieties are grafted on SO4 rootstock.

Plantation age ranged between 12 to 14 years, planted in the period 1992-1994.

Planting distances were made in experimental polygons of 2.2 m / 1.1 m, 2.0 m / 1.0 m and 2.0 m / 0.8 m (between vines rows / between vine stocks on row), being achieved a density of 4132, 5000, respectively 6250 vine stocks per hectare.

Training techniques were designed and achieved after the fast training technology (Oprea , 1978), using a laborious procedure that required both dry and green cuttings. These techniques are Guyot on stem and Lenz Moser cordon.

Fruit load at Victoria table grapes variety was between 10 buds and 20 buds per vine stock, establishing three levels of it: 10, 15 and 20 buds per vine stock and for wine varieties between 24 buds and 36 buds per vine stock, also with three levels : 24 ,30 and 36 buds per vine stock.

To each variety were attributed the same factors with the same levels of variation.

Because the location chosen for the experimental device was on a field located in the middle of south-eastern slope of Olt Hill, on an unprotected plantation trained on high stems, was used monoplane espalier with 3 rows of wires. For the Guyot cutting type on stem, were foreseen 3 rows of double wires, and for the Lenz Moser cutting type (bilateral cordon) - 1 carrying wire and 2 double wires. The placement of the first row of wires (for both training techniques) is made at 1,00m height above ground, and the following ones at 1,30 m, respectively 1,65 m height.

There were established three experimental polygons on the south-eastern slope of Olt Hill and in its middle third, as follows:

- Tămâioasă românească variety with 2 training techniques, 3 graduations of vine density, 3 graduations of vine stocks fruit load.
- Crâmpoșie selecționată variety with 2 training techniques, 3 graduations of vine density and 3 graduations of vine stocks fruit load.
- Victoria Variety with 2 training techniques, 3 graduations of vine density and 3 graduations of vine stocks fruit load.

The experimental device consisted of three experimental polygons arranged in 6 blocks with 9 variants for each block.

Each experimental variant visible marked with labels, included, depending on the situation 40 – 50 vine stocks that can be harvested , occupying 64 – 120 square metres, from which were taken samples for soil, plant and yield analyses (inclusively for microvinifications).

The duration of the experiment was 3 years: 2006-2008.

The experimental polygons were not very much different in terms of climatic and edaphic. Located on the middle third of the slope, experimental polygons received significant heliothermic conditions, moderate edaphic conditions, favorable to balanced yields, quantitatively and qualitatively.

In order to surprise the influence that technological factors graduations have on vine stocks growth and fructification, on grapes quantitative-qualitative production and finally on wines quality, was made within the experimental cycle a significant amount of field observations and determinations and laboratory analyses, which concerned both climatic and soil conditions, and vine agrobiology, physiology and biochemistry, grapes maturation and wines appreciation.

The soil profiles made in the delimited experimental polygons, located in the middle third of the slope, were identified as soil type and subtype, morphologically on genetic horizons.

1. VEGETATIVE GROWTH AND ITS QUALITATIVE ACCUMULATION.

Assigning different levels of technological factors intensity causes changes on vine stocks vigor, stimulating it or reducing it.

Increasing vine stocks density per hectare, while the fruit load remains the same accentuates leaves shading and simultaneously leads to the reducing of lighted leaves area of a vine stock.

By the fruit load growth per vine stock, the leaf area also increase, as a result of the evolution of a greater number of vine shoots on vine stock. The high density of vine stocks per hectare and the high fruit load per vine stock concur to an unfavorable climate for leaves growth.

At small planting distances it is registered a small average matured length of vine shoots, which decreases even more if for the same planting distance the fruit load per vine stock increase.

The matured length was enough in order to be ensured the number and length of fruit load elements depending on the fruit load and the planting distance on row.

When there are achieved high densities of plantations (6250 vine stocks / hectare) are determined smaller values of sugars in ropes that increase if the density of plantations is reduced (to 4132 vine stocks / hectare).

On the presence of soluble sugars in annual ropes depending on the fruit load per vine stock I have noticed that their value increase if there are assigned less and less fruit loads.

2. FERTILITY AND PRODUCTIVITY OF VINE STOCKS

The fertility and productivity of vine stocks records values specific to varieties with a slight variation plus or minus. (104 Tămâioasă românească and Crâmpoșie selecționată varieties).

At Victoria variety the fertility and productivity of vine stocks records values slightly below the specific value of the variety.

Note that fruit load influence on fertility and productivity is higher than the influence determined by the planting distance, although in both cases this influence is not very important.

3. PHYSIOLOGICAL AND BIOCHEMICAL PROCESSES

For all varieties, the transpiration economic coefficient records the lowest value at the variant where the lighted leaf area is bigger, that is at the lowest fruit load and density per hectare. This indicates that at this variant for the storage of 1 g SU is consumed by transpiration the lowest quantity of water, and the consumption of SU by respiration is minimum.

In terms of vine stocks density of the plantation and fruit load per vine stock, I observed that the transpiration economic coefficient values increase with the increasing of density or fruit load, which is valid for both training techniques and for all three varieties.

Small values of the transpiration economic coefficient are characteristic to qualitatively valorous varieties (104 Tămâioasă românească) and go together with quality.

4. THE QUANTITY AND QUALITY OF GRAPE YIELD

The fruit load per vine stock determines the increase of production per vine stock if the number of buds left on the vine stock increase, while the increasing of vine stocks density leads to the decrease of production per vine stock.

Grapes weight decreases when the density and fruit load increase, regardless of variety.

The average weight of Victoria grapes indicates that the small fruit load left on the vine stock leads to the obtaining of some big, showy grapes (as the table grapes are valued).

At smaller planting distances results a big number of vine stocks per hectare which leads to a high grape production per hectare, with the mention that depending on the fruit load can be realized a better quality.

The low density of vine stocks per hectare leads to the accumulation in grape of a bigger amount of sugar being a concordance between grape production and sugar accumulation into grapes.

Small fruit loads favor the accumulation of sugar in bigger amounts.

The increase of vine stocks density per hectare determines the increase of total acidity values, which can be also seen at the fruit load that when increases determines the acidity increase.

5. THE QUALITY OF WINES

The alcohol content of wines obtained from 104 Tămâioasă românească does not decrease below the minimum limit required by ONDOV decisions for the classification as DOC wines at none of the technological options. Getting semisweet wines can be achieved by exploiting only the grapes that have accumulated minimum 208 g of sugar / liter of grape must (Guyot on stem) or 210 g of sugar / liter of grape must (Lenz Moser), which corresponds to the fruit load of 24 buds per vine stock, regardless of density and to the fruit load of 30 buds per vine stock associated with 4132 and 5000 vine stocks density per hectare.

At Crâmpoșie selecționată wines, the acquired alcohol, from wine, decreases below 11.00 vol% (the minimum limit needed to be contained by a wine that is classified in DOC wines category) only at

maximum fruit load (36 buds / vine stock) with 5000 vine stocks/hectare density, respectively 6250 vine stocks/ hectare, a situation seen in both training techniques.

Increasing the density per hectare entails the increasing of total acidity of wine. The same happens with the acidity of the wine and the growth of fruit load per vine stock.

At 104 Tămâioasă românească variety the values of non-reducing extract are at all analyzed wines over 21.00 g / l, which shows that all wines can be classified as DOC.

The values of the non-reducing extract from Crâmpoșie selecționată wines shows that from all variants only those with 36 buds / vine stock fruit load belonging to 5000 and 6250 vine stocks / hectare density from both training techniques cannot be classified as DOC.

Very good wines are produced also at higher densities of vine stocks (5000 and 6250 vine stocks / hectare) in the context of a small fruit load (24 buds / vine stock), situations when the quantity of wine is bigger precisely because of the vine stocks density.

6. ECONOMIC EFFICIENCY

The Victoria grape production, the extra quality per hectare represents the highest percentage, between 47% and 76% of the total production obtained, specifying that large percentages were obtained at the lowest density (4132 vine stocks / hectare) and the lowest fruit load (10 buds / vine stock).

It is undisputed that the small fruit load contributes to the increase of grape quality on a vine stock, and the high density leads to the increase of grape quantity per hectare.

The profit obtained for the technological variants applied to Victoria variety was maximum (8518 lei) at maximum density of 6250 vine stocks / hectare, to which was attributed the fruit load of 10 buds / vine stock at Guyot training on stem.

Norming fruit load on vine stock is mandatory at Victoria variety.

The gross profit to 104 Tămâioasă românească, high quality variety, with great oenological potential, reached the highest value (5666 lei) at Guyot training on stem with 6250 vine stocks / hectare density and the fruit load of 24 buds / vine stock.

At Crâmpoșie selecționată variety, grapes were also capitalized for vinification and the biggest gross profit (3668 lei) was performed at Guyot training on stem with 6250 grapevines / hectare density and the fruit load of 30 buds / vine stock.