

**UNIVERSITY OF CRAIOVA
FACULTY OF HORTICULTURE**

DOCTORAL THESIS

***STUDIES ON DELIMITATION OF VITICULTURAL AREAS FROM
ȘTEFĂNEȘTI VINEYARD FOR WINE PRODUCTION WITH
CONTROLLED DOCUMENTATION NAME - DOC***

SUMMARY

**SCIENTIFICALLY COORDINATOR,
PROF. UNIV. DR. ING. GIUGEA NICOLAE**

**PhD STUDENT,
BERTA CORINA**

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This paper, structured in accordance with the specific requirements of the Doctoral School of the University of Craiova, highlights the necessary aspects of theoretical substantiation of the study, followed by the presentation of the results obtained, the conclusions and the bibliography.

Based on an old tradition, wine in Romania is recognized as a natural beverage constituting food. A good wine enjoys a unique appreciation and to achieve it have made considerable efforts.

The fame of the particularly pleasant attributes of Romanian wines is given not only by the extremely high value of some local varieties, which have given renown to wine centers: Fetească Albă from Alba Iulia, or Lechința, Grasă de Cotnari, Tămâioasa by Dragășani or Pietroasele, Crâmpoșie by Drăgășani, Busuioacă de Bohotin, Fetească neagră by Nicorești etc., but also the fact that the most famous foreign varieties that made the celebrity of certain regions and countries (Traminer, Sauvignon, Cabernet, Pinot) grown in Romania give wines that often have equaled or exceeded, through their "generosity" and fineness, those in their countries of origin.

The first part of the thesis is structured in two chapters and represents a synthesis of the information from the national and international specialized literature regarding the possibilities of delimitation of wine-growing areas for the production of quality wines, wines with DOC, wines with a registered designation of origin.

In the first chapter **ȘTEFĂNEȘTI - ARGEȘ VINEYARD - THE HISTORICAL, GEOGRAPHICAL AND NATURAL FRAMEWORK**, comprising 3 subchapters, the vineyard Ștefănești - Argeș is presented historically and geographically, but also of the natural environment and the tradition of obtaining grapes and quality wines.

Chapter 2 - **STAGE OF RESEARCH ON THE DELIMITATION OF QUALITATIVE WINE AREAS** is structured in 4 subchapters, which deal with the following aspects: conceptual terroir - definitions and technical and legal aspect and natural factors influencing the quality of vine-wine products.

The approach of this study focuses on the national and international concerns in the field, which aimed at studying the wine-growing areas. Investigating the favorability of the wine-growing area is an area of current interest. On the one hand, the vocation of an area is highlighted for a particular type of product. In this way, recommendations can be made on

the technology applied to both vine and wine-making. It is also possible to delimit the area favorable to obtaining products with a designation of origin. On the other hand, forecasts can be made about the dynamics of the wine-growing areas, but also the necessity of changing the assortments according to the current climate changes.

In Chapter III – **OBJECTIVES. MATERIAL AND METHOD**, the purpose of the study, the material and the working method are presented.

The study focused on three main objectives:

- Objective 1. Climatic assessment of the studied wine area
- Objective 2. The comparative study of the quality parameters of grapes - the raw material, varieties and viticultural years, and characterization of the phenological phases in the qualitative and quantitative maturation.
- Objective 3. Qualitative assessment of white, aromatic and red wines that define their authenticity and naturalness.

In order to achieve objective 1 - in the viticultural years mentioned, according to the methodology adopted in our country, we investigated a series of coefficients and indices of quantification of meteorological data, frequently used in wine-growing climatology.

For the achievement of objective 2 - in the viticultural years mentioned, according to the methodology adopted in our country, the specific elements of growth and maturation of the grapes were followed. At the end of the firstfruits, determinations of the anthocyanic potential of the grape varieties were made as well as the grape weight, the relative carbohydrate content (g / l) and the relative acidity content (g / l of H₂SO₄). In the extracts of the coloring matter from the grapes of the black varieties of foreign and autochthonous origin were determined the contents in anthocianins, involving the Poissant Leon high performance spectrophotometric method.

On the basis of the relationship between grape weight and relative contents of sugars and acidity were calculated absolute carbohydrate content and acidity and delineated full maturity phenophase and over maturity.

At full maturity and technological maturity (harvesting), the total grape polyphenols were also utilized using the Singleton and Rossi method. At full and technological maturity, the aromatic profile for Sauvignon semiaromatic varieties and aromatic Tămâioasă românească was determined.

In order to achieve goal 3, it was intended to obtain wines using traditional

technology for each grape variety.

The white, aromatic and red wines obtained by the application of specific technologies were rigorously analyzed, focusing on the physico-chemical and phenolic composition.

The following physico-chemical composition parameters were quantified: alcohol, total acidity (in H₂SO₄ and C₆O₆H₆), glycerol, non-reducing extract, ash. On the basis of the contents of the alcohol, glycerol, non-reducing extract and ash content, glycerol ratios were compared to the alcohol ($\text{glycerol} \times 100 / \text{alcohol}$) and ash versus the non-reducing extract ($\text{ash} \times 100 / \text{extract}$) their values (the ideal ones being 10%) signify the degree of naturalness and the legal framework for obtaining wines.

Semi-aromatic and aromatic wines also followed the aromatic profile by determining the content in terpene, free and bound in precursors.

Red wines attention was given and phenolic composition.

The anthocyanin complex was first investigated in terms of the participation of various pigment categories in its structure. Based on the absolute values of optical densities at the 420, 520 and 620 nm wavelengths, the color intensity and color tone were determined.

The official methods recommended by OIV - Paris and adopted by ICVV were used to analyze the productivity and quality components of grapes and wine composition.

Chapter IV, **RESULTS AND DISCUSSION**, is structured in 3 subchapters, showing successively the results obtained on each objective.

Subchapter 4.1 presents results on the assessment of climatic conditions in the Ștefănești - Argeș vineyard, during the research period.

Ensuring the quality of vineyard products requires a thorough knowledge of the natural (ecological) conditions at the vineyard level, with a special attention given to climate and soil factors.

From all the data analyzed, it appears that in Ștefănești, the area where the researches were located, it fully meets the temperature requirements for the production of quality white and red wines, but also for the most demanding of the production directions - the production of aromatic wines.

The vine is a plant with high claims to light, being an excellent heliophilic plant. Light is therefore one of the most important climatic factors for its production and quality.

The amount of sunshine hours shows variations not only from one year to the next, but also from one month to the next, which are natural, given that the duration of the day of the middle of the vegetation period (the second half of June) is clearly different from the beginning (April) and the end (September) of that period.

It can be said that during this period the light regime was rich enough to satisfy the requirements of the cultivated aromatic varieties.

Regarding the values of the climatic indices, it can be concluded that vineyard Ștefănești-Argeș benefits from a particularly favorable climate for viticulture, with a wealth of heliothermal resources but also with a good rainfall regime. The climate regime is characterized by a good distribution of rainfall, the most rainy months being the summer months, especially June when the highest temperatures and the longest sunshine duration are registered. During the months of August and September, when the ripening process is completed, the vineyard benefits from more heat and light, along with a decrease in precipitation.

Subchapter 4.2. refers to results on comparative study of grape quality parameters, varieties and viticultural years, and characterization of maturation phenophases in quantitative and qualitative terms in the vineyard of Ștefănești - Argeș.

Cultivated in a highly favorable area for vine cultivation, some varieties of the three are able to "offer" grape production from which can be obtained, as the case may be, current or high-quality consumption wines, even when harvesting is practiced at full maturity, reference moment-phenophase when the amount of grape is maximum. From this point of view, it is the Sauvignon variety, followed by Fetească regală.

In the over-maturation, not far from the full maturity, from the grapes of the Sauvignon variety can also be obtained wines with residual sugar, and those of Fetească regală variety can result in dry wines classified to one of the higher categories provided by the Technical Norms for the application of the Law of vine and wine. As far as the aromatic variety is concerned, the results show that biosynthesis of the bound terpenes takes place when the grapes are ripened.

With regard to black grape varieties, the overall analysis of the results obtained highlights the possibility of obtaining consistently high quality red wines without any corrections from Cabernet Sauvignon, Merlot and Fetească neagră varieties. This desideratum can be achieved by rigorously monitoring the grape maturity evolution each

year and choosing the most appropriate harvesting moments on a scientific basis when the carbohydrate, acidity and anthocyanin ratios are in full agreement with the type of wine to be elaborated.

In terms of color richness, expressed by the color intensity, the Cabernet Sauvignon variety is at the top of the varieties group ($I_c = 3.0$). Merlot and Fetească varieties are inferior to the Cabernet Sauvignon variety but very close ($I_c = 2.74$ and $I_c = 2.75$ respectively).

Subchapter 4.3. refers to results regarding the qualitative assessment of white, aromatic and red wines that define their authenticity and naturalness obtained in the Ștefănești - Argeș vineyard.

The parameters of attestation of the authenticity of white wines, the Alcohol / Glycerol and Extract / Ash ratios, by the values obtained from all the wines analyzed, obtained from the wine production in the period 2015-2017, indicate that we are in the presence of natural, authentic wines, high quality and wear, according to the category they belong to.

For red wines, the glycerol / alcohol ratios ranging from 9.71 to Cabernet Sauvignon and 9.90 to Merlot and the ash / extract ratio are below 10% but close to this level with 9 , 16 at Cabernet Sauvignon and 9.90 at Fetească neagra, place these wines in the class of high-quality and authentic red wine, authentic and natural.

Chapter V - CONCLUSIONS, contains the general conclusions drawn from the experiments, conclusions that emerged from the presentation of the results in each chapter and subchapter. The vineyard of Ștefănești-Argeș has a high degree of favorability for viticulture and the obtaining of white, aromatic and red wines, in line with the claims of the Romanian, and foreign consumers.