

**RESEARCH ON THE POSSIBILITY OF USING THE ECOLOGICAL
CONDITIONS IN THE RURAL AREA OF ȘIMNICU DE SUS
BY GROWING VINES**

Costea Dorin Constantin^{1*}, Mușuroi M. Alexandra-Nicoleta²

¹University of Craiova, Faculty of Horticulture

²University of Craiova, Faculty of Horticulture, master MCHDR

* Correspondence author. E-mail: musuroi.alexandra.f8z@student.ucv.ro

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ABSTRACT

The specific ecological conditions of the cultivation area can positively or negatively influence the quality of grape production, a fact expressed by the specificity of the wine-growing area.. The knowledge of particularities determined by the pedoclimatic conditions is important for elaborating and supporting the viticultural technical activities. The present study carried out in the corural area of Șimnicu de Sus aimed to demonstrate the favorability of the area for the culture of vines, to obtain quality productions with the aim of encouraging the development of this economic activity, in this peri-urban area with residents who need to obtain some additional gain

INTRODUCTION

It is known that *Vitis vinifera* L. varieties are affected by climate change (Battaglini et al. 2009, Leeuwen et al. 2019). The climatic and pedological conditions specific to the cultivation area impose the assortment of varieties and the direction of production (Bucur & Dejeu 2016, Dobrei et al. 2018, Radu et al. 2019).

The effect of variable climatic conditions in each crop year on the vine has been the subject of studies by numerous researchers (Cichi et al. 2009, Costea et al. 2015, Xenophon et al. 2020)

The ecological offer specific to the cultivation area has a decisive role in determining the assortment of cultivated vine varieties to obtain a quality production (Băbeanu et al. 2017, Bora et al. 2014, Mărăcineanu et al. 2018)

The climatic conditions specific to the area and the year of cultivation influence the intensity of the biochemical and physiological processes and, through them, the accumulation of substances that determine the quality of the grape harvest and give specificity to the wines obtained in the respective year and area.(Cichi et al. 2016, Căpruciu et al. 2022)

Among the climatic factors, temperature and water conditions as well as insolation have the greatest influence on the quality of the production obtained. In order to achieve a sustainable quality-oriented viticulture, studies have been carried out that try to identify the reaction mechanisms of the grapevine in variable environmental conditions (Burzo et al. 1999) and the interpretation of the adaptive

responses of the grapevine to stress abiotic (Bataglini et al. 2019, Duchene et al. 2010, Ubalde et al. 2010) to identify the most suitable technological measures that can be applied.

MATERIAL AND METHODS

The observations and determinations were carried out in the wine-growing center Șimnicu de sus- a wine-growing center located in the demarcated area for the production of wines with the Controlled Designation of Origin (DOC) "Banu Mărăciine", in a 14 year old vineyard, in the Tămâioasă românească variety grafted on Teleki 4 the selection Oppenheim 4 rootstock (SO4), with 2 x 1.2 m planting distance, semi-high growth.

In accordance with the research topic proposed, the observations and determinations focused on: monitoring climatic factors for the evaluation of the favourableness of the study year (2022) and studying the influence of the climatic conditions characteristic to the study years on the phenologic and productive parameters. For the evaluation of the climatic conditions, the meteorological data from the data provided by WorldWeatherOnline were used.

Other observations and determinations that have been made are specific to the field of study.

RESULTS AND DISCUSSIONS

The estimation of the climatic favourability of the cultivation year in the viticultural region was made as a synthesis of several climatic factors with positive and negative influence, by studying the normal conditions, the deficits or the excesses of the recorded values.

The 2022 vegetation period when determinations were made is characterised by time intervals of favourable temperature and humidity followed by time intervals of hot weather and no precipitations (Fig. 1-6).

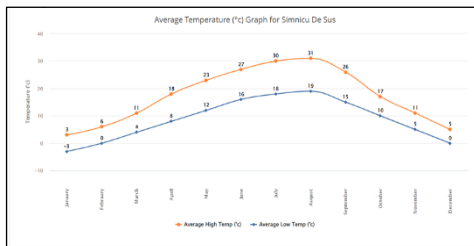


Figure 1. Average temperature (2010-2022)

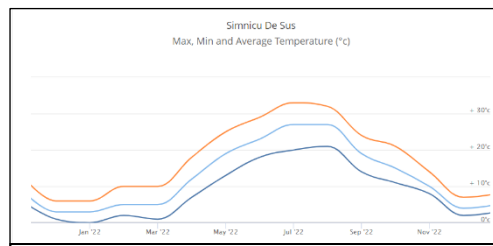


Figure 2. Monthly maximum, average and minimum temperatures during the experimentation period

Comparing the average monthly temperatures recorded during the experiment (figure 2) with the multi-year average (figure 1), higher temperature values are found for the year 2022, especially in the June-September period, when the average temperature values were approximately 2 higher degrees Celsius

Studying the rainfall data from the experimental period (Fig. 6) compared to the multi-year averages (Fig. 5), we generally find lower rainfall values in all months

with the exception of September, a fact that was reflected in the slightly lower sugar content at harvest.

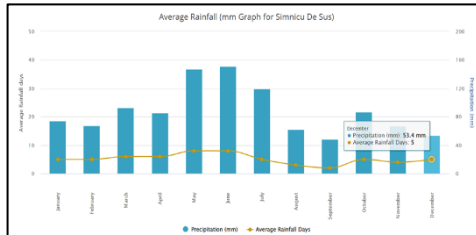


Figure 3. Average rainfall monthly amount and rainy days (2010-2022)

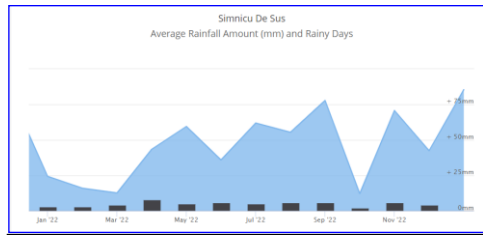


Figure 4. Rainfall amount and rainy days during the experimentation period

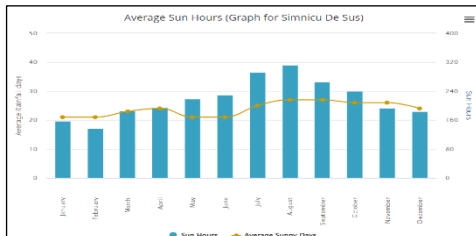


Figure 5. Average Sun hours and Sunny days (2010-2022)

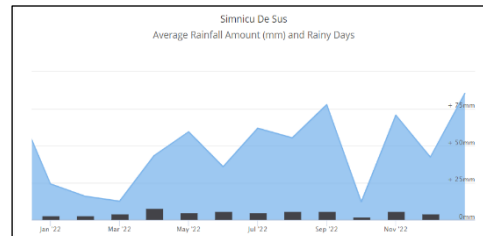


Figure 6. Sun hours and Sun days during the experiment period

The recorded values of insolation indicate the favourability of the crop year for vines, with higher insolation values being registered between July and September, a fact that influenced the determined physiological and bioproductive indices. Regarding insolation, no significant differences were recorded during the experiment period compared to the multiannual average. (Fig. 5, Fig. 6)

The factors that influence the initiation of phenophases during the vegetation period are ecological, genetic, physiological, biochemical and technological.

The evolution of the main phenophases of the variety Tămăioasa românească in 2022, when the study was carried out, is presented in the table. 1

Table 1

The evolution of the main phenophases of the variety Tămăioasa românească in 2022

Variety	Budburst	Flowering	Veraison	Fruit maturation and Harvest
Tămăioasă românească	20.IV-30.IV	5.VI-12.VI	10.VIII-20.VIII	20.IX-25.IX

The budburst started on April 20 and lasted about 10 days. The flowering started at the beginning of June (5.06.2022) and lasted 5-6 days. The veraison started in the middle of August (10-20 August), and the grapes reached full maturity

in the second half of September September 20-25. A slight delay in the first phenophases can be observed as a result of the less favorable climatic conditions at the beginning of the vegetation period.

Vine plants perceive the result of the interference of environmental factors and transmit it in the intensity of physiological and biochemical reactions that determine quantitative and qualitative changes in the composition of substances at the level of the whole body and especially of the fruit.

The production destination of the harvested grapes is the first condition to make the most of the potential of the variety, the conditions specific to the vineyard and the conditions of the harvest year. That is why the determination of the moment of harvesting is done by carefully following the ripening process of the grapes and calculating the maturity indices, which mainly summarize: the accumulation of sugars and the decrease of acidity.

It is necessary to establish the optimal time of harvesting to benefit from an optimal sugar and acidity content. The wrong choice of harvesting time can cause a low content of aromas in the peels, which in the case of the Tămâioasă românească variety have severe technological implications.

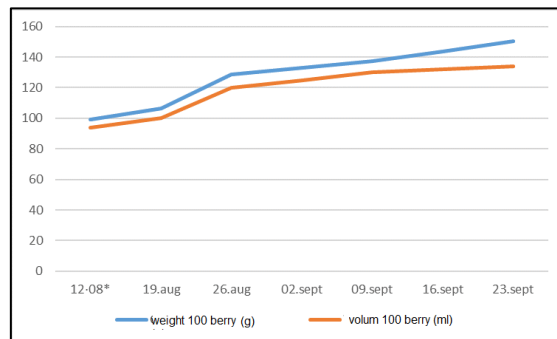


Figure 7. Evolution of berry weight and volume during ripening

Figure 7 shows the dynamic evolution of the weight and volume of the berry during ripening (from veraison to harvesting)

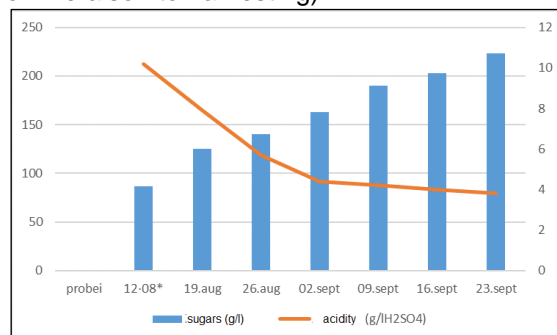


Figure 8. Evolution of the sugar content and the acidity of the berry during ripening

We can note that the lack of precipitation during the vegetation period did not negatively influence the ripening process, in terms of qualitative parameters. The

rainfall in September had an influence, when the value was above average, affecting the sugar content, which could have been higher

However, the Romanian Spicy variety showed a high accumulation potential, the sugar parameter increasing by 136.9 g/l in the period 12.08-23.09 under the conditions of a final acidity of 3.8 g/l - figure 8

The value of 58.8 of the gluco-acidimetric index indicates a good ripening of the grapes

CONCLUSIONS

The rural area of Șimnicu de Sus is characterized by a reduced economic development as a result of the current economic conditions, the migration of the population to the city and the application many times of non-performing technologies in agricultural activities, including in terms of vine culture

The diversity of climatic conditions during the research period was found in the variations of the bio-physiological indicators studied.

The studied variety interacted with environment conditions, expressing their adaptative potential in a specific way.

In this context, given the favorable pedological and climatic conditions and the tradition of obtaining quality wine products in this region, vine cultivation can represent a successful economic activity

The Tămâioasă românească variety taken in the study demonstrated the a good ripening of the wood, a good viability of the buds, and a high accumulation potential of the chemical constituents that indicate the quality.

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