STUDIES ON THE AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF GRAPE VARIETIES FOR AROMATIC WINES CULTIVATED IN THE IASI VINEYARD

STUDII ASUPRA VALORII AGROBIOLOGICE ŞI TEHNOLOGICE A SOIURILOR DE STRUGURI PENTRU VINURI AROMATE CULTIVATE ÎN PODGORIA IAŞI

COLIBABA Lucia Cintia[1]*, ROTARU Liliana[1], PINTILESCU I.[1], CIMPOI V.[1], AELENEI S.[1]
*Corresponding author e-mail: cintia.colibaba@gmail.com

Abstract. *The purpose of this paper is to study the climatic conditions of 2017 and to correlate them with the quality of the grape varieties for aromatic wines (Busuioacă de Bohotin, Tămâioasa românească and Muscat Ottonel), from the Ampelographic Collection of the Faculty of Horticulture Iasi. The climatic conditions specific to 2017 and their influence on production (grape mass, sugars, acidity, mass of 100 berries, etc.) were analyzed. The line of production specific to Iasi vineyard, namely the production of aromatic wines, should be maintained also under the current climatic conditions.*
Key words: aromatic grape varieties, climatic conditions, production indices

Rezumat. *Scopul acestei lucrări este de a studia condiţiile climatice ale anului 2017 şi de a le corela cu calitatea strugurilor soiurilor pentru vinuri aromate (Busuioacă de Bohotin, Tămâioasă românească şi Muscat Ottonel), din Colecţia ampelografică a Facultăţii de Horticultură Iaşi. Au fost analizate condiţiile climatice specifice anului 2017 şi influenţa acestora asupra producţiei (masa strugurilor, zaharuri, aciditate, masa a 100 de boabe, etc). Direcţia de producţie specifică podgoriei Iaşi, respectiv obţinerea de vinuri aromate, trebuie menţinută şi în condiţiile climatice actuale.*
Cuvinte cheie: soiuri de struguri aromaţi, condiţii climatice, indice de producţie

INTRODUCTION

Viticulture is famously sensitive to climate, with temperature and moisture regimes being among the primary elements of terroir, while growing season temperature being particularly important in delimiting regions suitable for growing wine grapes (Schultz, 2008). Global changes in suitability for wine production caused by climate change may result in substantial economic and

[1] University of Agricultural Sciences and Veterinary Medicine Iaşi

conservation consequences (Jones *et al.,* 2005). The aromatic grape varietes of Romania (Muscat Ottonel, Tămâioasă românească and Busuioacă de Bohotin) are of high importance to the local viticultural and winemaking industry, as they are extremely well evaluated and present are able to produce elegant wines.

MATERIAL AND METHOD

Climatic factors of 2017 were registered by the meteorological facility of SCDVV Iasi. Three aromatic grape varieties (Busuioacă de Bohotin, Tămâioasă Românească and Muscat Ottonel) were taken into study at harvest. All three were harvested from the Ampelographic Collection of USAMV Iasi on the 26th of September 2017. Grape quality analysis was registered.

RESULTS AND DISCUSSIONS

As it can be seen in table 1, year 2017 was characterized by temperatures that surpass the multi-annual means (a 10% increase), a lower quantity of rainfall (a 6% decrease) and higher sunshine periods (9% increase). Moreover, during summer months, responsible for the maturation profile of grapes, a 1.6% increase in temperatures, on average, was noted. At the same time, a decrease of rainfall during the vegetation period of almost 100 mm was registered.

Table 1

Comparative analysis of climatic elements between the year 2017 and the multi-annual mean of the last 20 years

Climatic elements	Multi-annual mean	2017
Global heat balance, (∑t°g)	3168.4	3335.7
Useful heat balance, (∑t°u)	1386.0	1566.8
Average temperature in July, °C	21.0	21.8
August,°C	20.3	22.8
September, °C	15.6	17.1
Absolute minimal temperature in air,°C	-27.2/ 28.12.1996	-18.7/20.01.
Annual average temperature T°C	9.8	10.8
∑ annual rainfall, mm	579.6	547.8
∑ rainfall in vegetation period, mm	398.1	293.4
∑ sunshine hours in vegetation period	1448.2	1580.4
Mean of maximal temperatures in August,°C	26.9	29.8
No of days with maximal temperatures > 30°C	17.3	39
Real heliothermal index (IHr)	2.0	2.5
Hidrothermal coefficient (CH)	1.3	0.9
Huglin heliothermal index (IH)	-	2238
Year characterization		Dry

The year was characterized as Dry, with a 130 % increase in the number of days with temperatures higher than 30 ^{o}C registered in August.

Figure 1 and figure 2 paint a very clear picture of the huge climatic changes that arise in present times. Taking into account that the composition of grapes is extremely sensible to climate characteristics, we expect to see some modifications from the usual profile.

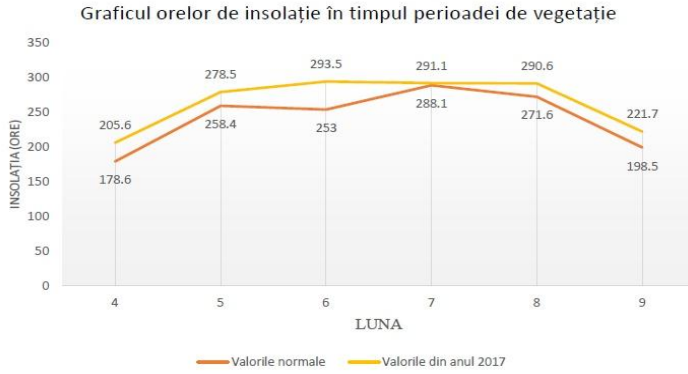

Fig. 1 Sunshine (hours) and rainfall (mm) during multi-annual mean of the last 20 years compared to values of 2017

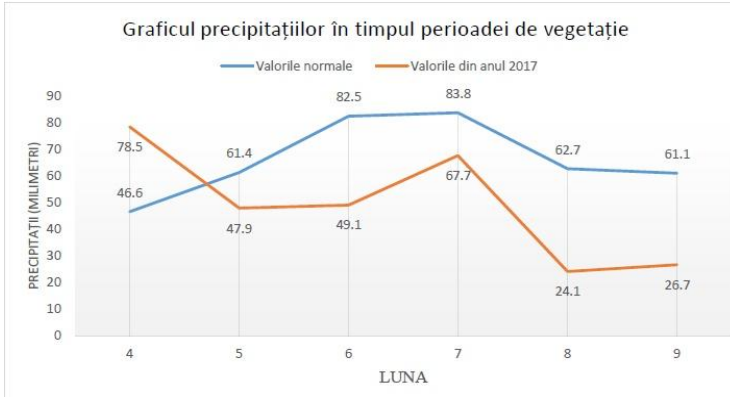

Fig. 2 Rainfall (mm) during multi-annual mean of the last 20 years compared to values of 2017

The quality analysis on the three grape varieties demonstrated the hypothesis to be true. Not only was the berry mass at the lower part of the range expressed in specific literature (Dobrei *et al.,* 2017), due to decreased rainfall, but also, the sugar content was unusually high. As the grapes were harvested on the 26th of September, there was a possibility of an even higher sugar concentration, if the over-ripening option would have been taken into account.

Table 2

Compositional characteristics of grapes harvest of 2017 in Iasi vineyard

Grape variety	Berry mass (g)	Berry mass in literature (g)	Sugars (g/L)	Sugars in literature (g/L)	Total Acidity (g/L H_2SO_4)	Total Acidity in literature (g/L H_2SO_4)
Muscat Ottonel	175	170-210	209	190-210	3.86	3.8-4
Tămâioasă Românească	208	200-250	248	240-250	4.85	4.5-5
Busuioacă de Bohotin	204	190-230	234	185-200	4.56	4-5

The total acidity can be considered low, taking into account that Iasi vineyard is one of the most northern regions of Romania and that here, acidity should be almost at a maximum (Bucur and Dejeu, 2017).

CONCLUSIONS

During the last decades, significant warming trends were observed. This trend of temperature increase is almost certainly going to continue in a future warmer climate. The results of grapevine responses to climate change (tendency to reduce grape yield, a highly significant increase of sugar content, reducing must acidity) are very important for the winegrowers because the three studied varieties are the the most important aromatic cultivars in Romania. The results of this study can become the basis for viticultural zoning in the new conditions. Starting from the current situation of global warming and predictions for the future, adaptation measures in viticulture should be implemented.

REFERENCES

1. **Bucur Georgeta Mihaela, Dejeu L., 2017** – *Researches on situation and trends in climate change in south part of Romania and their effects on grapevine*, Scientific Papers. Series B, Horticulture. Vol. LXI, ISSN 2285-5653, pg 243-247.
2. **Dobrei A., Rotaru Liliana, Dobrei Alina, 2017** – *Viticultură, ampelografie, oenologie.* Editura Solness Timişoara.
3. **Jones Gregory V. et al, 2005** – *Climate Change and Global Wine Quality, Climatic Change*, Vol. 73,nr. 3, pp 319–343
4. **Schultz H .R, 2008** – *Climate change and viticulture: A European perspective on climatology, carbon dioxide and UV-B effects*, Australian Grape and Wine Research, Vol. 6,nr. 1, pg. 2-12.