STUDIES OF SOME WINES OBTAINED IN THE AMPELOGRAPHICAL COLLECTION OF USAMV IASI DURING 2013-2015

STUDII ASUPRA UNOR VINURI OBŢINUTE IN COLECŢIA AMPELOGRAFICĂ USAMV IAŞI ÎN PERIOADA 2013-2015

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Abstract. *Romania, as many other viticultural countries of the world, is confronted with many climatic imbalances, who are making their presence felt more and more over the past decade. The influence of the climatic factors on the grape production quality is deeply reflected in the wine quality and its technological process.The aim of this article is to objectively analyze the climatic influences that can affect the wines' quality, with a strong focus on wines obtained in the North-East of Romania, Iasi vineyard. Three climatic parameters were taken into study: temperature, insolation, rainfall from the studied vineyard. Yearly, six wine samples from different grape varieties were collected and, after three years (2013, 2014 and 2015), they were analyzed. The results can be used to build a model solution for wine-making and vine culture in the new climatic conditions. Constant quality of Romanian wines is the most important request of the international wine market.*
Key words: climatic conditions, grape varieties, structural characteristics of wines

Rezumat. *România, ca de altfel majoritatea ţărilor viticole ale lumii, se confruntă cu diverse dezechilibre climatice, simţite din ce în mai puternic în ultimul deceniu. Influenţa factorilor climatici asupra calităţii producţiei de struguri se reflectă intens în procesul de fabricaţie a vinurilor. Scopul acestei lucrări este de a face o analiză obiectivă a influenţelor climatice ce pot afecta calitatea vinurilor obţinute în nord-estul României, cu precădere în podgoria Iaşi. S-au luat în studiu trei parametri climatici: temperatura, insolaţia şi regimul de precipitaţii din podgoria studiată, comparându-se rezultatele obţinute în urma analizelor fizico-chimice a şase probe de vin diferite pe o perioadă de trei ani 2013, 2014 şi 2015. Rezultatele obţinute pot fi folosite pentru a previziona soluţii tehnologice pentru cultura viţei de vie sau pentru procesul de vinificaţie. Calitatea constantă a vinurilor româneşti este un deziderat necesar şi important.*
Cuvinte cheie: condiţii climatice, soiuri de struguri, caracteristici structurale vinuri

INTRODUCTION

The climate has a major influence on vineyard development and hence wine quality. In the last 20 years, climatic variations appeared and, by means of

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thermic and hydric changes, led to a fluctuating grape productions and modifications in quality (Cotea *et al,* 2008). Therefore, an uncertain future of viticultural products and more importantly, their quality appears.

Combined with longer hang times aimed at optimizing current perceptions of aromatic grape maturity, climate change has brought about a number of important winemaking challenges derived from grape composition. The main microbiological and technological challenges are higher temperatures of harvested grapes delivered to the winery, higher environmental temperatures during fermentations, higher grape berry sugar and, possibly, potassium concentrations, lower acidity levels and higher pH values (Mira, 2010)

The aim of this article is to analyze the structural parameters of some wines in Iaşi vineyard, by taking into consideration some climatic indexes of the last 3 years. The study focuses on the problems that may arise from climatic changes from a physical-chemical point of view (wine storage, wine conditioning, wine aging).

MATERIAL AND METHOD

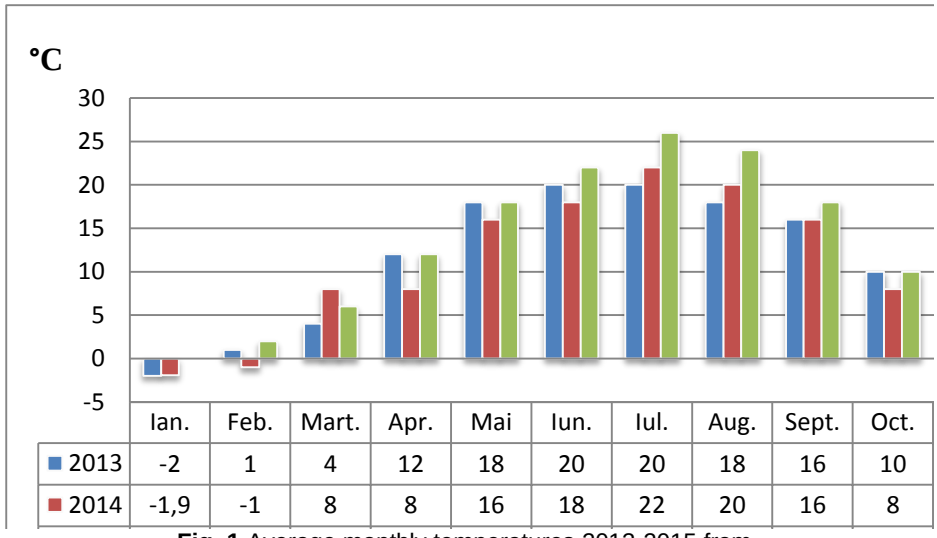
The study material comprised of six wines obtained from grapes of the Ampelographical Collection of USAMV Iaşi, part of the Iaşi vineyard, Copou viticultural center. The chosen varieties, each year, were Merlot, Cabernet sauvignon, Pinot noir and Muscat Ottonel, Tămâioasă românească and Frâncuşă, some cosmopolitan and some traditional Romanian varieties. The grapes were harvested all at once, not reaching full maturity. All wines were obtained using the general technological flux for white, red and aromatic wines (Cotea and Sauciuc, 1985). Physical-chemical analyses were performed in 2013, 2014 and 2015, in conformity with the OIV methods and regulations (OIV, 2016).

RESULTS AND DISCUSSIONS

Average monthly temperatures registered during 2013-2015 (fig. 1) show a heating trend, with high fluctuations of temperature during the seasons, with average temperatures in January 2015 of 0^{o}C and major differences (2.5 ^{o}C) in average yearly temperatures between 2013 and 2015.

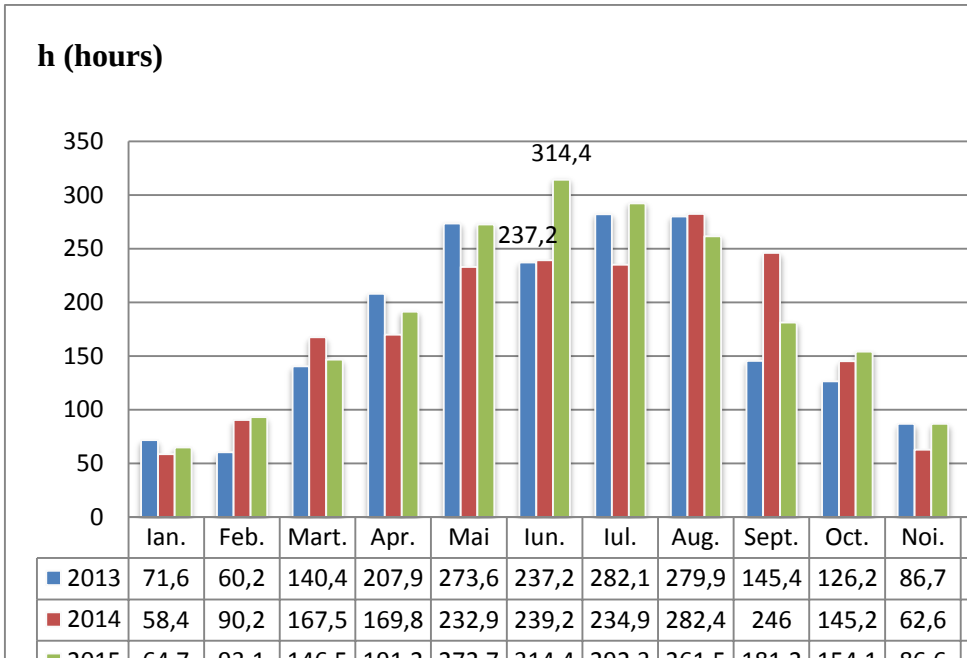
The sun shining duration (fig. 2) also varies during the three analyzed years. Ranging between total values were 1987.5 in 2013, 1405.2 hours in 2014 and 2154.6 hours in 2015. For example, in June 2015, the sum of sun shining hours was of 314.4 compared to the same months from previous years, where under 240 hours were registered. 2015 was registered as a very caloric year.

The rainfall regime (fig. 3) registered in 2013 was close to normal values, only a bit higher in May, June and September (76 mm, 225 mm, 100 mm respectively), with a monthly average of 56 mm. In 2014, rainfall was not uniform, with a monthly average of 54 mm. In 2015, a rapid decrease in rainfall was registered, the highest amount being observed in March and June, with 51 mm. The monthly average was very small, of 32 mm. 2015 was considered a very dry year for the North-East of Romania.



	Ian.	Feb.	Mart.	Apr.	Mai	Iun.	Iul.	Aug.	Sept.	Oct.
2013	-2	1	4	12	18	20	20	18	16	10
2014	-1,9	-1	8	8	16	18	22	20	16	8

Fig. 1 Average monthly temperatures 2013-2015 from http://www.meteoromania.ro/anm



	Ian.	Feb.	Mart.	Apr.	Mai	Iun.	Iul.	Aug.	Sept.	Oct.	Noi.
2013	71,6	60,2	140,4	207,9	273,6	237,2	282,1	279,9	145,4	126,2	86,7
2014	58,4	90,2	167,5	169,8	232,9	239,2	234,9	282,4	246	145,2	62,6

Fig. 2 Average sun shining duration 2013-2015 from http://www.meteoromania.ro/anm

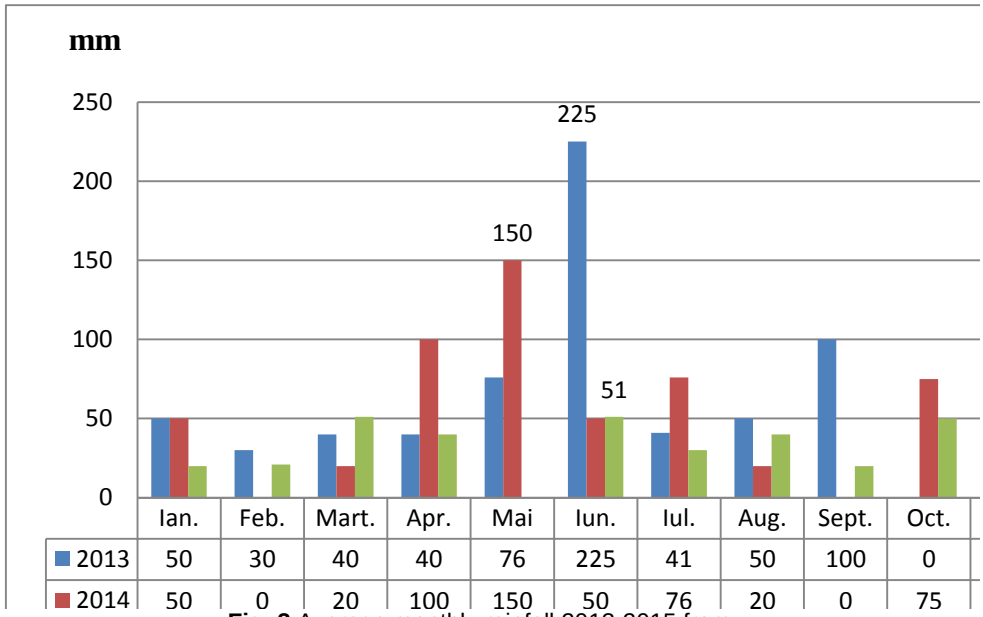


Fig. 3 Average monthly rainfall 2013-2015 from http://www.meteoromania.ro/anm

Table 1

Structural composition of wines obtained in the Ampelographic collection of USAMV Iaşi during 2013-2015 period

Parameter / Sample	Free SO2 mg/L	Total SO2 mg/L	Alc. Conc. %vol	Total Ac. g/L tartaric acid	Volatile acidity g/L acetic acid	Red. Sugars g/L	EST g/L	EN g/L
CS 2015	42.83	89.57	12.5	5.09	0.49	7.9	24	16.02
CS 2014	18.89	70.3	13.2	5.84	0.46	2.4	21.4	19.92
CS 2013	6.81	38.9	11.6	6	0.22	1.4	19	17.56
PN 2015	27.58	92.49	13.8	4.67	0.52	6.4	25.3	16.84
PN 2014	16.2	46.79	14.2	6.77	0.23	3.5	26.1	22.55
PN 2013	30.35	82.68	13.4	5.64	0.28	2	24.5	22.43
M 2015	31.15	91.84	13.2	4.82	0.4	8.4	24.8	16.32
M 2014	27.5	85.47	11.8	5.54	0.41	2	19.8	17.81
M 2013	6.5	34.6	11.2	4.38	0.79	1.8	18.3	16.5
Fr 2015	53.22	110.1	11	5.36	0.75	19.5	39.6	20.1
Fr 2014	86.74	132.4	11.8	8.54	0.41	1	15.7	15.07
Fr 2013	40.41	94.28	11.1	6.88	0.45	10.7	31.5	14.79
TR 2015	35.69	110.99	11.9	4.82	0.79	6.2	37.6	31.33
TR 2014	75.11	138.57	11.6	6.93	0.31	15.4	29.4	13.93
TR 2013	7.74	39.01	11.5	6.16	0.4	6.2	22.9	16.66
MO 2015	47.05	126.89	14.2	3.83	0.79	10.9	26.3	15.37
MO 2014	43.6	109.34	12.2	6.43	0.33	1.3	19	17.66
MO 2013	69.98	218.63	11.4	7.5	0.72	2.5	29.2	15.02

The physical-chemical characteristics of the analyzed wines are presented in table 1.

Microbial stability in finished wines may be challenging at higher pH values, especially if high alcohol concentrations that usually accompany this phenomenon are reduced unilaterally, or residual sugars remain in the wine in order to avoid high alcohol concentrations (Mira, 2010).The free SO_2 ranges in large limits, suggesting that, in wines obtained during years with higher rainfall, a larger quantity is needed to protect against microorganism attack. For example, in the case of Muscat Ottonel wines, during 2013-2015, a drop of almost 23 mg/L was registered. The total SO_2, of course dependent on the wine type, raw matter health and storage duration, is in general under the legal limit, higher for white wines.

Total acidities range between 3.8 g/L tartaric acid (Muscat Ottonel in 2015) and 8.5 g/L tartaric acid (Francuşă in 2014). Volatile acidity ranges between 0.22 g/L acetic acid (2013 Cabernet sauvignon wine) and 0.79 g/L acetic acid (2015 Muscat Ottonel and Tămâioasă românească).

All wines have an alcoholic concentration higher than 11% vol, which, knowing that the grapes were not harvested at technical maturity, shows a mirror image of what would happen if this was respected. At the same time, taking into account that the fermentations were stopped in order for aromatic wines to have remnant sugars, the potential alcoholic concentration is also quite high for a Northern region.

The calculated extract does not surpass by much the legal limit, in some cases being even under it, but again, it must be taken into account that the grapes were harvested earlier and had not reached technological or phenolic maturity.

In general, the changing climatic conditions all over the globe may lead to important structural and geographical shifts in the worldwide wine map. Several viticultural regions in Australia may become unsuitable for premium wine production in the current century (Hall and Jones, 2009) while several European regions may have to rethink current concepts of terroir with regards to cultivar selection and winemaking technology (Seguin and Garcia de Cortazar, 2005; White, Whalen and Jones, 2009). Even in cooler climates that are said to have benefited from climate change so far (Jones and Davis, 2000), a more interventionist winemaking style involving removal of sugars in must, acid adjustments and alcohol reductions, are becoming more and more required. The specific methods and technologies that are suitable and available to winemakers to address climate change-associated challenges will depend on the consumers' request and local regulatory circumstances. Of course, another worrying factor is the rise in alcohol concentration, fact that has become a steady problem for almost all wine producers.

On the other hand, the extreme climate change can also have positive influence on extending the vine culture limits more towards the north and also on the culture of more red grape varieties.

CONCLUSIONS

The analyzed data confirm the unstable meteorological effects on winemaking standards.

Difficulties appear in years with hydric or thermal extremes, as was seen, at a much smaller scale, of course, in the above mentioned examples. 2013, year with a higher rainfall and lower average temperatures, yielded wines with high acidity and lower alcoholic concentration, most of the obtained wines being dry. 2015, year with a higher hydric deficit and also higher thermal pressure, led to obtaining wines with lower acidities, opening the gate for many possible microorganism-caused faults or diseases and for a sensorial unappreciated wine.

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