ASPECTS OF BEHAVIOR OF WINE GRAPES IN THE DEALU BUJORULUI VINEYARD IN TERMS OF CLIMATE CHANGE

ASPECTE PRIVIND COMPORTAREA UNOR SOIURI DE STRUGURI DE VIN IN PODGORIA DEALU BUJORULUI IN CONDITII DE SCHIMBARI CLIMATICE

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Abstract. *Recent years have seen a trend of climate change, with impacts on vine behavior. Climatic data analysis showed an increase in mean annual temperature. They observed changes in thermal regime of extreme values .Following the more pronounced warming and a growing deficit in the summer hydric, intensified aridity phenomenon. Amid the trend of climate change in a study on the behavior of wine grapes in the Dealu Bujorului vineyard.*
Key words: climate parameters, vine, variety, production, quality.

Rezumat. *În ultimii ani s-a observat o tendință de modificare a climei, cu influențe asupra comportării viței de vie. Analiza datelor climatologice a evidențiat o creştere a temperaturii medii anuale. S-au observat schimbări în regimul unor valori termice extreme. Urmare a încălzirii mai pronunțate şi a unui deficit hidric în creştere în timpul verii, s-a intensificat fenomenul de aridizare. Pe fondul tendinței de modificare a climei s-a realizat un studiu asupra comportării unor soiuri de struguri de vin în podgoria Dealu Bujorului.*
Cuvinte cheie: elemente climatice, viță de vie, soi, productie, calitate.

INTRODUCTION

Since the 80s and until now, we face a warming trend. Expected changes in temperature and precipitation is likely to lead to periods of vegetation change, the zoning varieties and many other changes that do not currently provide but which may grow in time (Enache, 2010). Predictions based on global climate models show we can expect a more frequent occurrence of extreme weather events and associated risks and damage can become significant. Reduction and better crops and damage grape vines in vineyards as a result of climatic events (frost early fall, late spring frosts, excessive negative temperatures, rainfall etc.) lead to significant losses for wine heritage (Alexandrescu, 1994, Târdea, 1995).

MATERIAL AND METHOD

The research was conducted in an experimental polygon within RDSVV Bujoru, in 2008-2010. Observations were made to three varieties of grape for wine: Merlot,

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Aligote and Feteascã neagrã. Monitoring of climatic factors was performed on the RDSVV Bujoru Weather Station, with an AGROEXPERT system. They made observations and measurements, the varieties of grape production and quality.

RESULTS AND DISCUSSION

They analyzed data from a period of three years (2008-2010) to investigate the behavior of wine grape varieties in the context of global climate change in Dealu Bujorului Vineyard, where they stand and Development Research Station for Viticulture and Winemaking Bujoru. Climatic factors in the period studied correspond to drought years (table 1).

Table 1

The main Climate Parameters at Bujoru Research and Development Station for Viticulture and Vinification in the period 2008-2010

Climate Parameter	2008	2009	2010
Global Thermic Balance, (Σt°g)	3694,9	3664,2	3067,4
Active Thermic Balance, (Σt°a)	3645,3	3510,9	2949,1
Net Thermic Balance , (Σt°u)	1875,3	1660,9	1537,5
Σ Annual Rainfalls , mm	364,7	357,4	624
Σ Rainfalls during the Vegetation Period , mm	224,8	174,6	415,6
Σ Number of Insolation Hours in the Vegetation Period , hours	1332,7	1560,6	1357,9
Average Annual Temperature, °C	12,9	11,2	10,6
Average Temp. in the month of – July, °C	24,0	23,8	22,8
– August,°C	25,9	22,1	24,6
– September,°C	17,1	17,2	16,1
Air Absolute Minimum Temperature,°C	-14,5	-15,2	-25,2
Data	5.I	9.I	26.I
The Maximum Temperature in the Month of August,°C	32,0	30,8	31.7
Average Temperature in the I-st and II-nd decades of the month of June	21,9	20,5	21,4
Wind Speed (km/hour)	2,0	2,5	2,1
Relative Air Humidity (%)	54	74,1	76
Nebulosity	6,2	3,3	6
No. Of days with Maximum Temperatures > 30°C	52	44	40
Length of Bioactive Period , days	177	186	189
Real Heliothermic Index	2,50	2,56	2,09
Hydrothermic Coefficient	0,6	0,49	1,41
Vine Bioclimate Index	11,8	17,0	5,09
Index of Oenological Ability	5003,2	5149,1	4141,4
Annual Aridity Index	15,92	16,85	16,6
Characterization of the year	Slightly dry	dry	dry

Dealu Bujorului vineyard is located in the south of Moldova, dry character area, with annual average temperature of 11,5°C and in the vegetation period of 19,3°C. During 2008-2010 there is a decrease in mean annual

temperature. We note that only 2009 monthly average temperature is maximum in July, in 2008 and 2010 it is recorded in August. Average maximum temperatures in August ranged between 30,8 and 32,0 ° C. Absolute minimum temperatures generally are recorded in January and absolute minimum was -25,2 ° C/26.01.2010. A synthetic indicator value (real heliothermic index, vine bioclimatic index and index of oenological ability) indicates an area favorable for vines, balanced and very good favorability red and white varieties. Monthly evolution of air temperature (fig. 1) reveals that only in 2008 on the vegetation period were recorded multiannual average higher values, in 2009 and 2010 average temperatures are lower than multi-year, except August in 2010.

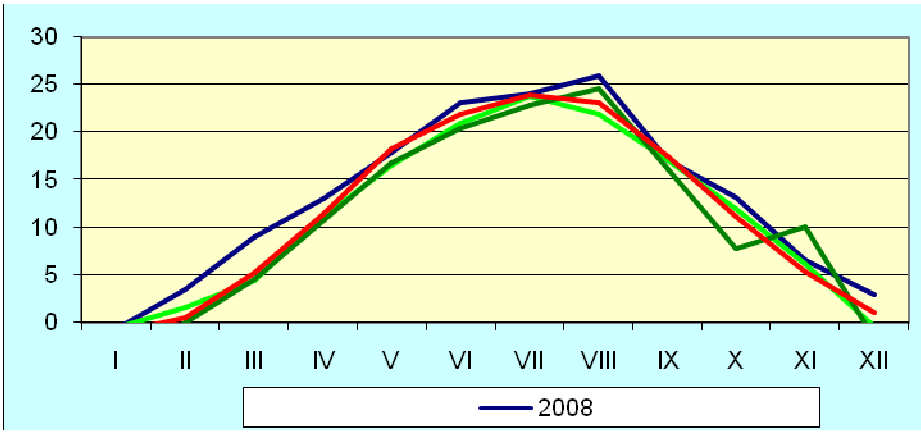

Fig. 1 - Montly Evolution of Air Temperature during the period 2008-2010

Global heat balance of the vegetation has values between 3067,4 - 3694,9°C and show that the Dealu Bujorului Vineyard are provided with the ripening of the grapes to age V and VI, VII era precautions. Active and useful heat balance shows a downward trend during the period studied.

During the analyzed, rainfall had a patchy distribution, with more heavy rain falling for long periods of deficient rainfall. In the 2008-2009 annual rainfall had both deficit and the growing season. In 2010 the amount exceeds the annual average rainfall in May, June and July and in August-September there was a strong hydric deficit (fig. 2). Although the amount of rainfall in 2010 exceeded the annual average, year can be characterized as dry.

Deficit rainfall during the growing season, combined with excessive temperatures for short periods of time leads to increased hydric deficit during that period, influenced the culture of vine. For cultivation of vines often do media / annual amounts have major importance, but extreme values of some indicators (absolute minimum temperature, maximum temperatures in July and August, average temperature of decades I and II of June, the number of days with air temperature higher 30,0° C etc.).

To climatic elements in the period studied, varieties reacted differently, depending on each specific genetic, cultural measures applied, the size of production achieved in previous years etc.

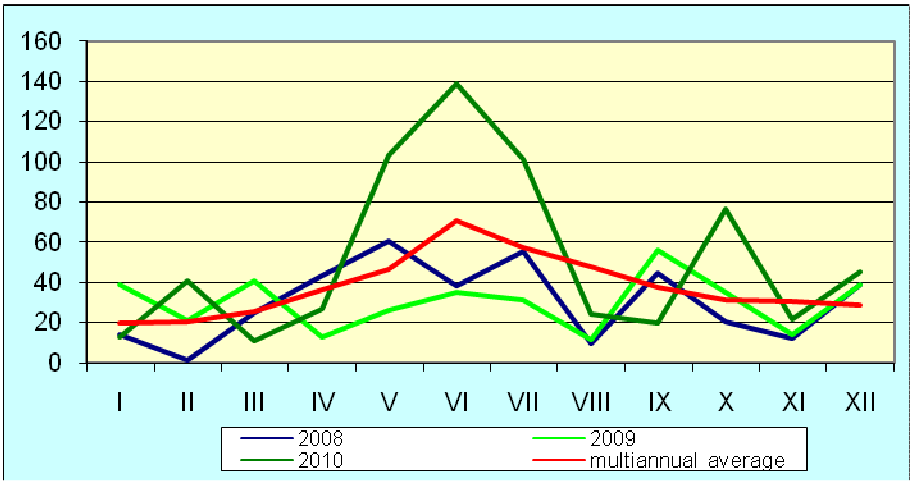

Fig. 2 - The monthly Evolution of Rainfalls during the years 2008-2010

In climatic conditions of the year 2008, the varieties taken in observation productions have been carried out between 2,39 kg /hub vine and 2,67 kg / hub (fig. 3). Severe drought in 2008 and 2009 led to a drop in production in 2009. Productions in the 2010 were lower and were influenced by both the hydric deficit in August / September and excessive negative temperatures in late January that affected the main buds.

Throughout the period analyzed, the climatic conditions of 2009 have most influenced the production of Merlot that was most sensitive. Note that low production Merlot was influenced by that culture technology has been applied in "organic farming system".

Productivity depending on the hub, the classification of studied varieties, in descending order is: Aligoté, Feteascã neagrã and Merlot. Note the influence of 2006, 2007, 2008 on production in 2009.

Small grape production made to reflect the quality of grapes (weight of 100 grains, sugar content and acidity must). Qualitative indices of production valued, in sugar content and total acidity of must, have evolved depending on variety and climatic conditions (fig. 3, 4, 5, 6).

Low potential for accumulation of sugars showed variety Aligoté, followed by Merlot and Feteascã neagrã. Acidity is in inverse relationship to sugar content.

Weight of 100 grains is influenced by fluid intake during the growing season and plant health of planting. Considering the evolution of varieties during 2008-2010, Feteascã neagrã and Aligoté variety was balanced out productions.

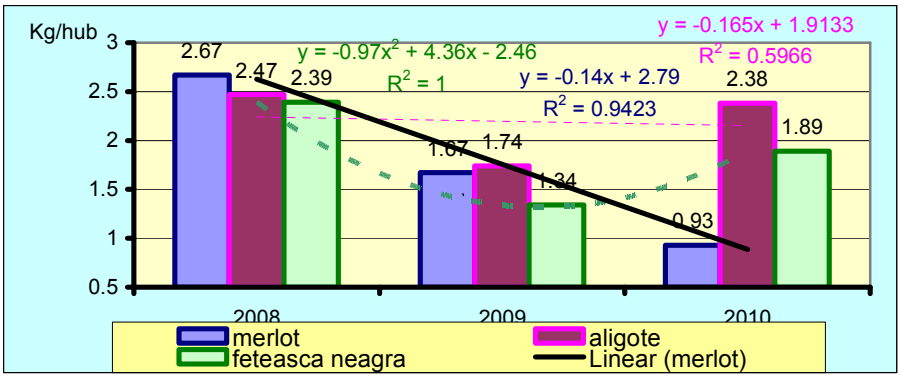

Fig. 3 - Grape Production during the period 2008-2010

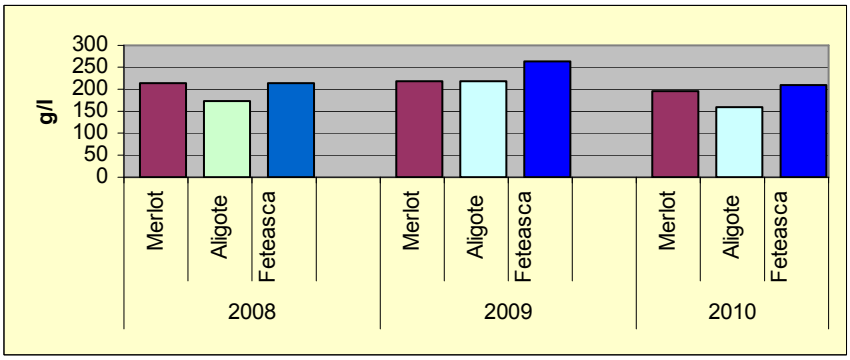

Fig. 4 - Grape Sugar Content (g/l)

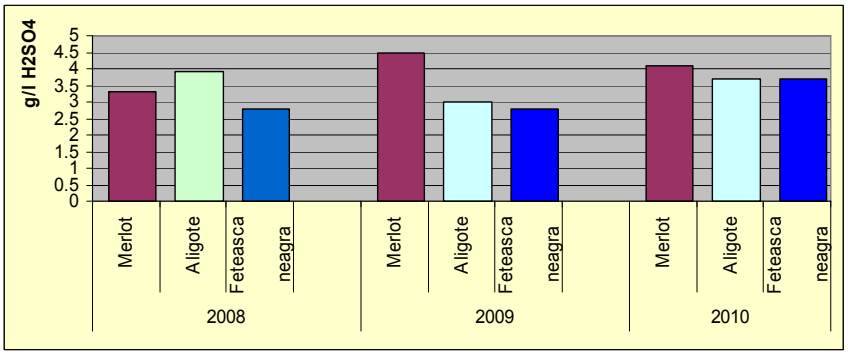

Fig. 5 - Must Acidity (g/l H_2SO_4)

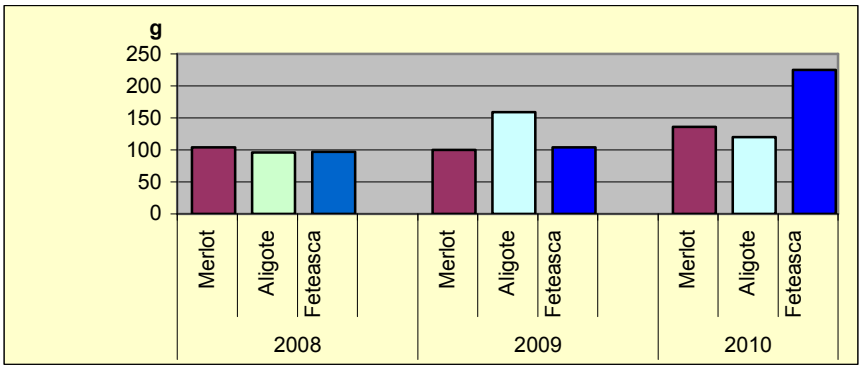

Fig. 6 - Weight of 100 grains (g)

CONCLUSIONS

1. In the period 2008-2010 are obvious trends in the evolution of climatic factors with direct impact on production and quality potential of varieties.

2.In recent years we are witnessing a trend of reduced annual rainfall and in the vegetation period in alternation with excess precipitation. Increased heavy rains lead to reduced recovery of rainfall and hence the gain aridisation.

3.Average annual air temperature is down slightly (average annual air temperature from 11,2° C to 10,6° C), average maximum temperatures during the growing season have a tendency to shift from July to August

4.Registration of atypical values of climatic parameters (absolute minimum excessive temperature extremes etc.) was reflected directly on production and quality of grapes.

5.Considering the evolution of varieties in 2008-2010, Feteascã neagrã and Aligoté variety performed quantitative and qualitative balance, variety being the most sensitive Merlot.

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