THE INFLUENCE OF A DRY YEAR ON THE GRAPE PRODUCTION IN DEALU BUJORULUI VINEYARD

INFLUENŢA UNUI AN SECETOS ASUPRA PRODUCŢIEI DE STRUGURI ÎN PODGORIA DEALU BUJORULUI

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Abstract. *The researches were carried out at the Research and Development Station for Viticulture and Vinification Bujoru in the conditions of a particularly dry year. The main objective of the paper is to establish the influence of extreme weather conditions on grape production. The combat production was analyzed in quantitative and qualitative aspect for the varieties: Bujoru, Blasius, Negru aromat, Muscat Ottonel 49 Bj and Șarbă. Based on the mechanical components of the grapes, technological indices were calculated whose values complement the qualitative characteristics of the varieties. Under the climatic conditions of 2020, the analyzed varieties did not reach their biological potential.*
Key words: grape, tehnological indices, climatic factors, quality

Rezumat. *Cercetările s-au efectuat la Staţiunea de Cercetare Dezvoltare pentru Viticultură şi Vinificaţie Bujoru în condiţiile unui an deosebit de secetos. Lucrarea are ca obiectiv principal stabilirea influenţei condiţiilor climatice extreme asupra producţiei de struguri. S-a analizat producţia de struguri sub aspect cantitativ si calitativ la soiurile: Bujoru, Blasius, Negru aromat, Muscat Ottonel 49 Bj şi Şarbă. Pe baza componentelor mecanice ale strugurilor s-au calculat indicii tehnologici ale căror valori completează însuşirile calitative ale soiurilor. În condiţiile deficitare din punct de vedere climatic ale anului 2020, soiurile analizate nu au ajuns la potenţialul lor biologic.*
Cuvinte cheie: struguri, indicatori tehnologici, factori climatici, calitate

INTRODUCTION

Lately we are witnessing the variation of global climatic factors as a result of global warming caused by the amplification of the greenhouse effect. Climate change has been highlighted frequently in recent decades by rising air temperatures, considerable decrease in atmospheric precipitation (rain and snowfall) and the occurrence of extreme weather events (Irimia and Patriche, 2019). All these aspects directly influence the production of grapes both in terms of quantity and quality (Martin, 1972; Țârdea and Dejeu, 1995). The analysis of how the grape production was affected in a particularly dry year in the Dealu Bujorului vineyard was analyzed (Nechita *et al.*, 2014).

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MATERIAL AND METHOD

To evaluate the quality of grapes at harvest, five varieties of wine were studied during 2020*:* Bujoru, Blasius, Negru Aromat, Muscat Ottonel 49 Bj and Șarba 25/45. At harvest, quantitative and qualitative analyzes were performed (physico-chemical analyzes), namely: the concentration of must in the sugar (g / L), the acidity (g / L tartaric acid) and the weight of 100 grains (g). The analysis of the mechanical composition was performed in order to calculate the technological indices that characterize the quality of the grapes and the technological efficiency. When harvesting the grapes, the following parameters were determined: number of grains (normal and beaded), mass of the grains, weight of the cob, mass of the juice, volume of the juice, mass of the marc and no. grains /100 g bunches).

RESULTS AND DISCUSSIONS

Obtaining wine grapes of a special quality is influenced by the action of climatic factors during the vegetation period, especially during the maturation period correlated with the genetic specificity of each variety. The timing of the harvest is especially important moment. The wine year 2019-2020 started with a surplus thermal regime, against the background of deficient water resources (table1). From the pluviometric point of view, the 2020 year is dry both on the background of the deficient precipitations and as a result of their distribution. April is particularly dry. The frequency of occurrence of the risk factor - drought is maximum in July (67.7%) and August (74.2%), when 21 days were recorded with maximum air temperatures > 30ºC, respectively 23 days.

Table 1

Climatic factors during the vegetation period of 2020 year in Dealu Bujorului Vineyard

Month	Air temperature, (˚C)			Rainfall mm	No. day with T>30^{0}C	Time of sunshine (hours)	Index chilly nights
	Average	Maxim abs.	Minim abs.				
IV	10.5	26.0	-7.3	2.8	0	255.5	-
V	15.2	31.6	4.0	42.6	3	204.5	-
VI	21.4	34.2	2.6	79.3	13	254.5	-
VII	23.3	37.0	9.9	72.8	21	348.0	-
VIII	23.4	35.9	10.4	47.9	23	333.5	-
IX	19.3	34.0	4.8	44.0	9	256.4	11.3

The grapes were harvested at full maturity (tab. 2). The low rainfall in August and the high temperatures in August and September led to a large accumulation of sugars. The grapes have matured very quickly, the daily rate of accumulation in sugars being high. The determinations regarding the accumulations of sugars in the must show that the Bujoru, Şarba 25/45 and Negru Aromat varieties have a high potential for accumulation of sugars in the must, being valuable from this point of view.

The grape production is maximum for the Blasius variety (2,420 Kg / ha) and minimum for the Negru Aromat variety. The acidity of the must is maximum in the Blasius variety on the background of high sugar content.

Table 2

The quality of the grapes at harvest (2020)

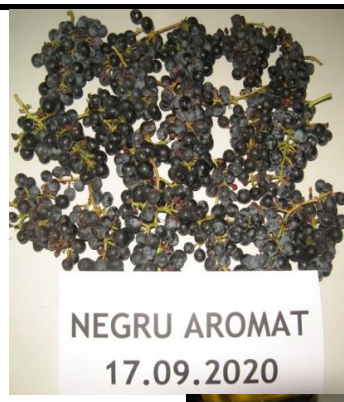
Physical-chemical characteristics	Variety				
	Bujoru	Blasius	Negru Aromat	Muscat Ottonel 49 Bj	Şarba 25/45
Harvest time	09.09	17.09	17.09	09.09	09.09
Sugars, g/L	247	259	250	211	240
Acidity, g/L tartric acid	5.25	7.34	5.43	3.89	4.42
Production (Kg/but)	1.886	2.420	1.834	2.194	2.036

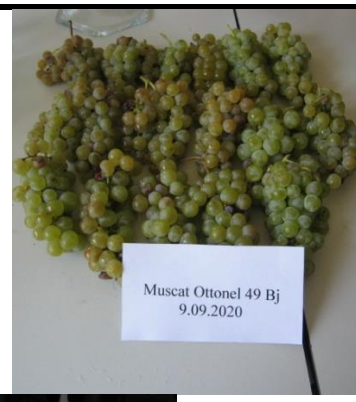
The mechanical analysis of the grapes showed obvious differences from variety to variety, depending on their biological potential and climatic conditions in 2020 (tab. 3).

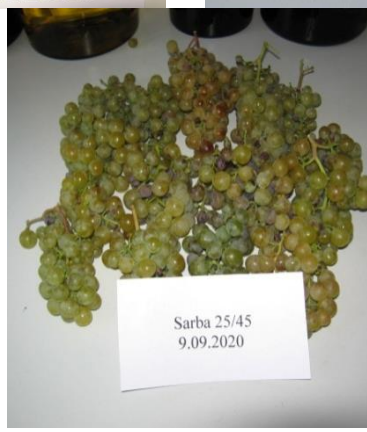
Table 3

Physical-mechanical analysis of one kg the grapes at harvest (2020)

Mechanical analysis	Variety				
	Bujoru	Blasius	Negru Aromat	Muscat Ottonel 49 Bj	Şarba 25/45
Number of grains,	655	741	1125	856	757
- normal	581	689	1046	767	669
- meiate, beaded	74	52	79	89	88
The mass of the grains, g	950	960	946	961	961
The weight of the cob, g	50	40	54	39	39
The mass of the juice, g	629	569	592	679	637
The volume of the juice, cm^3	419	301	370	428	419
The mass of the marc, g	321	391	354	282	324
No. grains / 100 g bunches	65.5	74.1	112.5	85.6	75.7







In the conditions of a year with accentuated water deficit, with rains with uneven distribution, with high air temperatures, the physical-mechanical composition of 100 grains and one kg of grapes at harvest was unfavorably influenced, this presenting values lower than normal which led to a lower juice yield (tab. 3, tab. 4).

Table 4

Physico-mechanical composition of 100 grain (2020)

Mechanical analysis	Variety				
	Bujoru	Blasius	Negru Aromat	Muscat Ottonel 49 Bj	Şarba 25/45
The weight of the grains, g	167.0	128.0	89.6	149.3	208.3
Volume, cm^3	146.7	118.3	83.3	133.3	185.0
Number of seeds	178.0	255.3	170.0	240	218.6
Seed weight, g	7.7	8.6	4.6	11.0	11.0
Skin weight, g	25.3	38.3	27.0	38.0	44.7
Pulp weight, g	134.0	81.1	58.0	100.3	152.6
Bunch weight (cob), g	8.0	6.0	6.6	6.3	7.7

Technological characteristics of grape varieties analyzed were evaluated based on values index composition of the grain, index grains, grape composition index and yield index (tab. 5).

Index composition of the grain (pulp weight / weight skins + weight seed). Varieties analyzed had values lower than the limit of five, values between 1.73/Negru Aromat to 4.09/Blasius. This index value of grain composition indicates a higher proportion of skins and seeds that will adversely affect the yield of must. The values of the grain composition index - highlight the fact that the genotypes did not reach the parameters specific to the production direction in which they fall.

Index grains provide information on the size and weight of the grain and are calculated as the number of berries per 100 grams of grapes. The value of the lowest bean index was registered for the Bujoru variety (65.7) and the highest for the Negru Aromat variety (112.5), due to the small grains. In most varieties the grains did not reach their specific weight.

Grape composition index. The high values of this index they had Muscat Ottonel 49 Bj and Şarbă 25/45 (24.6) varieties with well-constituted grapes, with a high yield in normally developed berries. The lowest ratio between grain weight and rachis weight is found in the Blasius variety with a very low structural index of 15.4, uncharacteristic of the variety.

The yield index had low values, between 1.32 (Blasius) and 2.12 (Muscat Ottonel 49 Bj) due to grains with a low percentage of pulp to the detriment of skin and seeds.

Table 5

Technological indices of the grapes at harvest (2020)

Index/variety	Bujoru	Blasius	Negru Aromat	Muscat Ottonel 49 Bj	Şarba 25/45
Index composition of the grain	4.06	4.09	1.73	1.83	2.05
Index grains	65.5	67.4	74.1	112.5	85.6
Grape composition index	19.0	15.4	24.0	17.5	24.6
Yield index	1.70	1.54	1.32	1.45	2.12

CONCLUSIONS

1. In the case of wine varieties and clones, the production achieved was influenced by the action of climatic factors specific to the wine-growing area in 2020 in correlation with the genetic specificity of each genotype.

2. The accentuated and prolonged drought of 2020 adversely affected the mechanical properties of the grape structure, which showed lower values than normal, which led to a lower juice yield.

3. The data obtained from the physical-mechanical analyzes of the grapes allowed the evaluation of the technological properties of the studied varieties by

calculating some indices, whose values express the technological, economic and commercial value, completing their quality characteristics.

4. The low amount of precipitation in August and the warm weather during the ripening of the grapes, positively influenced the accumulations of sugars, all the varieties and clones studied achieving high concentrations.

5. By analyzing the physical properties of grapes, in 2020, following the accentuated water deficit, the analyzed varieties did not reach their biological potential.

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