RESEARCH REGARDING THE INTERDEPENDENCE BETWEEN THE QUANTITY AND THE QUALITY OF THE YIELD, FOR THE GRAPEVINE VARIETIES GROWN IN THE AVEREŞTI WINE-GROWING CENTRE - HUŞI VINEYARD

CERCETĂRI PRIVIND INTERDEPENDENȚA DINTRE CANTITATEA ŞI CALITATEA PRODUCȚIEI, LA SOIURILE DE VIȚĂ DE VIE CULTIVATE ÎN CENTRUL VITICOL AVEREŞTI-PODGORIA HUŞI

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Abstract. *The vine-growing center Avereşti is situated in the sloping zone of the Huşi vineyard, characterized by a lower level of heliothermic resources. These facts determine small sugar content and a high acidity of the must, the yield being generally valorized as table wines, sparkling wines, and rarely as the quality wines. Through the researches carried out between 2000-2002, it was established that the diminution of the yield quantity assures the increase of the sugar accumulation and the reduction of the acidity of the must. The results were used for establishing the yield level wich permit the obtaining of the quality wines at the Fetească albă, Fetească regală şi Aligote varieties.*

Rezumat. *Centrul viticol Avereşti este situat în zona deluroasă a podgoriei Huşi, caracterizată printr-un nivel mai redus al resurselor heliotermice. Acestea determină acumularea unor cantități mai mici de zaharuri în boabe şi un nivel ridicat al acidității mustului, producția de struguri fiind valorificată de regulă ca vinuri de masă, vinuri materie primă pentru spumante şi mai puțin ca vinuri de calitate. Prin cercetările efectuate între anii 2000-2002, s-a constatat că diminuarea producției de struguri asigură creşterea concentrației mustului în zaharuri şi într-o mai mică măsură, diminuarea aciditățiı mustului. Pe baza datelor obținute, s-au stabilit pentru soiurile Fetească albă, Fetească regală şi Aligote, nivelurile de producție care permit obținerea vinurilor de calitate.*

INTRODUCTION

The obtaining of the quality wines in the septentrional vineyards is conditioned by the climate favorability during the vegetation period. The lacking of thermic resources becomes a limitation factor for the sugar accumulation in the grapes, especially in the plantations situated on the high plateau, and with reduced resources of the solar radiation. Is the state of the Averesti wine-growing centre, situated in the northern part of the Husi vineyard, in a sloping region, with an average altitude of 280 m. In the condition of using the actual training system, the valorization of the biological qualitative potential of the white qualitative wines varieties, Feteasca alba, Sauvignon, and Pinot gris, become possible only in the years with climatic favorability, long and sunny autumns.

The aim of the research carried out between 2000-2002, it was to establish the relations between the level and the quality of the yield, and the limits of the yield between that the quality of the grapes assure the obtaining of the qualitative wines every year.

MATERIALS AND METHODS

The characteristics of the Averesti vine-growing centre are: the average temperature 9.6 °C, the annual precipitations 566.2 mm and the real insolation1438.6 hours.

The biologic material was the Fetească albă, Fetească regală and Aligote varieties, grafted on Kober 5 BB. The plantations are situated on a plateau of 285 m altitude and present the next characteristics: 2.2 between the rows and 1.2 m between the vines on the row, the density by 3490 vines/ha, the training form bilateral cordon with semi-high trunk. It was established 4 experimental variants:

- V_1, with 10.4 bud-load/m^2;
- M, with 17.0 bud-load/m^2;
- V_2, with 20.8 bud-load/m^2;
- V_3, with 24.6 bud-load/m^2.

The determinations: *the yield on the trunk and at the ha, the sugar content in the must, the sugar accumulation on the ha, the total acidity.*

1. The yield level. For the Fetească albă variety, the 10.4-24.6 bud-load/m^2 assures 2.04-4.59 kg grapes/vine. With the same bud-load, the Fetească regală variety realize 3.06-5.06 kg grapes on the vine, and the Aligote variety 2.44-4.27 kg/vine **(tab. 1**). The yield level for a ha is of 7.71-17.39 t for the Fetească albă variety, 11.58-19.15 t for the Fetească regală variety and 9.25-16.16 t for the Aligoté variety. The smallest quantities of grapes on the vine and the ha, were obtained with a load of bud of 10.4/m^2, while the biggest quantities of 24.6 buds/m^2 for the Fetească albă variety and 20.8 buds/m^2 for the Fetească regală and Aligoté varieties.

2. The sugar content in the must. The sugar accumulation was negatively correlated with the load of bud. The highest sugar concentrations were recorded at V_1 variant (10.4 buds/m^2), while the lowest at V_3 variant (24.6 buds/m^2). For the Fetească albă variety, which has the highest quality potential, the sugar content in the must was of 174.67-188.67 g/l; for the Fetească regală variety it was of 156.07-182.03 g/l, and for the Aligoté variety of 182.83-160.53 g/l.

3. The local product index. It expresses the sugar quantity which is accumulated for a ha plantation, and depends, on a high level, on the yield quantity. For the Feteasca albă variety, the values of the local product index was of 924-1971 kg sugar/ha; for the Feteasca regală variety of 1369-2125 kg/ha and for the Aligoté variety of 1098-1796 kg/ha (**tab. 1**).

Table 1

The yield, the sugar content in the must, the local production index and the total acidity of the must, depending on the bud-load, for the varieties grown in the Avereşti vine-growing centre, the Huşi vineyard (average values, 2000-2002)

SPECIFICATION		FETEASCĂ ALBĂ				FETEASCĂ REGALĂ				ALIGOTE´			
		V_1	M	V_2	V_3	V_1	M	V_2	V_3	V_1	M	V_2	V_3
The yield	Kg/vine	2.04	3.48	4.32	4.59	3.06	4.27	5.06	4.98	2.44	3.7	4.27	3.59
	t/ha	7.71	13.14	16.23	17.39	11.58	16.26	19.15	18.83	9.25	14.18	16.16	13.58
The sugar content in the must (g/l)		188.67	183.3	177.63	174.47	182.03	175.63	170.80	156.07	182.83	174.3	171.03	160.53
The local production index (sugar, kg/ha)		924	1512	1873	1971	1369	1855	2125	1909	1098	1606	1796	1416
The total acidity of the must (g/l, H_2SO_4)		5.39	5.44	5.57	5.69	6.87	6.97	7.23	7.61	6.55	6.86	6.90	6.96

4. The total acidity of the must. It positively correlates with the bud-load. The following values were obtained: 5.39-5.69 g/l H_2SO_4 for the Fetească albă variety, 6.87-7.61 g/l H_2SO_4 for the Feteasca regală variety and 6.55-6.96 g/l H_2SO_4 for the Aligoté variety.

5. The correlations between the yield quantity and the sugar content in the must. Negative correlations between the yield quantity and the sugar content in the must were recorded: for the Feteasca albă variety, r = - 0.9989; for the Feteasca regală variety, r = - 0.8009; for the Aligoté variety, r = - 0.7952 (**tab. 2**).

Compared to the M variant, the increase of the yield with 1 kg/vine determines the decrease of the sugar content in the must with 6.75-7.95 g/l for the Fetească albă variety, 6.11-27.54 g/l for the Feteasca regală variety and with 6.42-24.42 for the Aligoté variety.

Table 2

The values of the correlation and regression index, between the yield and the sugar content in the must (average values, 2000-2002)

VARIETY	Variant	Yield (kg/but.)	Sugar (g/l)	Correlation coefficient (r)	Regression coefficient (y/x)
Feteasca albă	V_1	2.04	188.67	- 0.9989	+ 5.37
	M	3.48	183.3		0
	V_2	4.32	177.63		- 6.75
	V_3	4.59	174.47		- 7.95
Feteasca regală	V_1	3.06	182.03	- 0.8009	+ 5.28
	M	4.27	175.63		0
	V_2	5.06	170.8		- 6.11
	V_3	4.98	156.07		- 27.54
Aligoté	V_1	2.44	182.83	- 0.7952	+ 6.45
	M	3.75	174.37		0
	V_2	4.27	171.03		- 6.42
	V_3	3.59	160.53		- 24.42

The decrease of the yield with 1 kg/vine compared to the M variant, determines the increase of the sugar content in the must with 5.37 g/l for the Feteasca albă, 5.28 g/l for the Feteasca regală and 6.45 g/l for the Aligoté variety.

6. The correlation between the yield and the local production index. There is a positive correlation between the yield and the local production index: for the Feteasca albă variety r = +0.9993; for the Feteasca regală variety, r = +0.9667 and for the Aligoté variety, r = +0.9862 (**tab. 3**). The biggest sugar quantities/ha, correspond to the highest yield levels, achieved with 24.6 buds/m^2 for the Fetească albă variety, 20.8 buds/m^2 for the Fetească regală variety and 20.8 buds/m^2 for the Aligoté variety.

Compared to the M variant, the increase of the yield with 1 t/ha, assures the increase of the sugar content with 100.8-116 kg/ha for the Feteasca albă variety, 55-93.4 kg/ha for Feteasca regală and 95 kg/ha for Aligoté. For the Aligoté variety, the exceeding of the biological yield potential, by overlooading the V_3 variant, determines the decrease of the sugar content with 116 kg/ha.

The decrease of the production level with 1 t/ha compared to the M variant, is accompanied by the decrease of the sugar content with 108 kg/ha for the Feteasca albă variety and with 103 kg/ha for the Feteasca regală and Aligoté varieties.

Table 3

The values of the correlation and regression coefficients between the yield and the local production index, depending on the bud-load (average values, 2000-2002)

VARIETY	Variant	Yield (t/ha)	Sugar (kg/ha)	Correlation coefficient	Regression coefficient
Feteasca albă	V_1	7.71	924	0.9993	-108.0
	M	13.14	1512		0
	V_2	16.23	1873		+ 116.0
	V_3	17.39	1971		+ 100.8
Feteasca regală	V_1	11.58	1369	0.9667	- 103.0
	M	16.26	1855		0
	V_2	19.15	2125		+ 93.4
	V_3	18.8	1909		+ 55.0
Aligoté	V_1	9.25	1098	0.9862	- 103.0
	M	14.18	1606		0
	V_2	16.16	1796		+ 95.0
	V_3	13.58	1416		- 116.0

Table 4

The values of the correlation and regression coefficients between the yield and the total acidity of the must depending on the bud load (average values, 2000-2002)

VARIETY	Variant	Yield (kg/but.)	Must acidity (g/l H_2SO_4)	Correlation coefficient (r)	Regression coefficient (y/x)
Feteasca albă	V_1	2.04	5.39	0.8969	- 0.034
	M	3.48	5.44		0
	V_2	4.32	5.57		+ 0.154
	V_3	4.59	5.69		+0.225
Feteasca regală	V_1	3.06	6.87	0.7880	- 0.082
	M	4.27	6.97		0
	V_2	5.06	7.23		+ 0.316
	V_3	4.98	7.61		+ 0.901
Aligoté	V_1	2.44	6.55	0.8746	- 0.274
	M	3.75	6.86		0
	V_2	4.27	6.90		+ 0.076
	V_3	3.59	6.96		+ 0.625

7. Correlation between the yield quantity and the total acidity of the must. By analyzing the experimental data, it can be noticed that the must acidity is not significantly influenced by the yield quantity.

The correlation coefficient has positive values : for the Fetească albă variety, r = 0.8969; for the Fetească regală variety, r = 0.7880; and for the Aligoté variety, r = 0.8746.

The values of the regression coefficient show that each 1 kg grapes/vine, more than the M variant, determines the increase of the must acidity with 0.154-0.225 g/l H_2SO_4 for the Fetească albă variety, 0.316-0.901 g/l for the Feteasca regală variety and 0.076-0.625 g/l H_2SO_4 for the Aligoté variety (**tab.4**). For the V_2 and V_1 variants, these differences are insignificant.

CONCLUSIONS

1. The yield is negatively correlated with the sugar content in the must: for the Feteasca albă variety, r = -0.9989; for the Feteasca regală variety, r = - 0.8009; for the Aligoté variety, r = - 0.7952. The smallest yield quantities per vine and per ha, correspond to the highest sugar concentrations.

2. The decrease of the yield with 1 kg/vine ensures the increase of the sugar content in the must with 5.37 – 7.95 g/l for the Feteasca albă variety, 5.28 – 27.5 g/l for the Fetească regală variety and 6.45 – 24.4 g/l for the Aligoté variety.

3. The yield positively correlates with the local production index. The increase of the yield with 1 t/ha, determines the increase of the local production index with 100.8-108 kg sugar/ha at the Feteasca albă variety, 55-103 kg sugar/ha for the Feteasca regală variety, and 95-116 kg/ha for the Aligoté variety.

4. The yeld does not significantly influence the must acidity. The decrease of the yield with 1 t/ha, determines the decrease of the must acidity with 0.034-0.225 g/l H_2SO_4 for the Fetească albă variety, 0.082-0.091 g/l H_2SO_4 for the Fetească regală variety and 0.274-0.625 g/l H_2SO_4 for the Aligoté variety.

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