PRELIMINARY STUDIES ON THE INFLUENCE OF THE SOIL MAINTENANCE SYSTEM ON THE BEHAVIOUR OF GROS SAUVIGNON VARIETY IN VINEYARD ODOBESTI

CERCETĂRI PRELIMINARE PRIVIND INFLUENŢA SISTEMULUI DE ÎNTREŢINERE A SOLULUI ASUPRA COMPORTĂRII SOIULUI GROS SAUVIGNON ÎN CONDIŢIILE PODGORIEI ODOBEŞTI

BOSOI Marioara[1], MIHU G.[1], BOSOI Ionica[1], STOIAN Ileana[1]
e-mail: mioara_bosoi@yahoo.com

Abstract. This paper aims to address a comparative study concerning the response of the variety Gros Sauvignon on some agro biological and productive characteristics, by application of the various soil maintenance systems in the conditions of vineyard Odobesti. To ensure an optimal balance between growth and production in the conditions to achieve optimal quality, in the period 2009 - 2011, at SCDVV Odobesti has experienced the influence of the soil maintenance system on characteristics and productive agro biological of Gros Sauvignon variety.
Key words: grassing, fertility coefficients, soil maintenance system

Rezumat. *Lucrarea de faţă îşi propune să abordeze un studiu comparativ privind reacţia de răspuns a soiului Gros Sauvignon ca si caracteristici agrobiologice şi productive, la aplicarea diferitelor sisteme de întreţinere a solului, în condiţiile podgoriei Odobeşti. În vederea asigurării unui echilibru optim între creştere şi producţie în condiţiile realizării unei calităţi optime, în perioada 2009 – 2011, la S.C.D.V.V. Odobeşti s-a experimentat influenţa sistemului de întreţinere a solului asupra caracteristicilor agrobiologice şi productive ale soiului.*
Cuvinte cheie: înierbare, coeficienti de fertilitate, sistem de intretinere a solului

INTRODUCTION

Gros Sauvignon is one the oenological valuable varieties, part of the basic assortment of quality white wines (DOC). The comparative with Petit Sauvignon variety show greater vigor, lower sugar concentration and higher grape production (Oslobeanu et al., 1980, Constantinescu et al., 1960). Under cultivation on soils with high fertility combined with ordering a medium or high vigor rootstock, the variety show force of increasing in detrimental productivity and high production quality. Optimizing quality wine production is a major goal of viticulture millennium, by those not incidentally stated today that "*great wines are made in the vineyard plantation*" (Fergoni, 2003), or "concept of quality starts in the vineyard" (Schlamp, 2001).

---

[1] Research and Development Station for Viticulture and Vinifications Odobesti, Romania

303

MATERIAL AND METHOD

The research works has been conducted in the experimental polygon agrotechnical of SCDVV Odobesti. Biological material is represented by Gros Sauvignon variety grafted on Berlandieri x Riparia - Sel. Oppenheim 4.

The plantation was established in 2004, with the following characteristics:
- planting distance of 2,0 / 0,9 m (density of 5555 vines / ha); the training on half steam; pruning system – mixed; type of pruning – Cazenave Cordon;
- fruit loading - 15.5 eyes/sq.m (28 eyes per vine), spread over four units consisting of one short cane of 5 eyes and one spur of 2 eyes;

The soil is a medium leached chernozem with favorable fertility for vine culture, the humus content in middle (2.0 to 2.3%), and a good supply of nutrients. The slope is 1-2%, with exhibition southeast.

Were studied three soil maintenance system: field black, permanently grassing with *Lolium perenne* and pemanently grassing with *Medicago sativa*. The three experimental variants were located in the field by the method of subdivided parcels. Each experimental variant was three repetitions, each set comprising a total of 21 plants of the vine.

Were made observations, measurements and determinations of the elements of fertility (fertile shoots, the coefficients of fertility) and the quantity and quality of grapes. The measurements on grape production was done by weighing individual of grapes per vine and the determinations of the grape production quality, that the sugar content and acidity were performed at full maturity of the grapes.

RESULTS AND DISCUSSION

The climatic conditions during the study are presented in tables 1 and 2.

Table 1

Climatic conditions during the study

Year Month	Average temperature (°C)				Sunlight (hours)			
	Multi annual	2008/ 2009	2009/ 2010	2010/ 2011	Multi anuala	2008/ 2009	2009/ 2010	2010/ 2011
X	11,2	11,8	12,0	8,1	172,8	184,9	131,2	107,0
XI	5,2	5,7	6,7	10,1	106,9	76,2	94,5	109,5
XII	0,3	2,2	-0,6	-2,3	78,3	75,0	67,9	68,8
I	-1,7	-0,5	-4,2	-2,5	84,5	66,0	61,5	60,0
II	0,1	1,5	-0,1	-1,6	103,1	89,7	96,7	133,8
III	4,4	5,2	5,2	4,6	149,8	158,5	186,0	191,1
IV	11,1	12,4	11,6	10,6	187,8	245,1	183,5	196
V	16,6	17,5	17,1	16,6	250,3	240,6	236,1	265
VI	20,0	21,0	20,1	20,9	274,3	260,3	209,5	262,5
VII	22,0	23,8	23,3	22,4	299,2	322,8	277,0	285
VIII	21,2	22,9	24,7	22,1	285,2	289,1	295,5	332,3
IX	16,7	18,9	16,7	20,0	218,9	243,3	189,0	293,5
Average/ annual sum	10,6	11,8	11,0	10,7	2211,1	2251,5	2028,4	2304,5
In vegeta- tion period	17,9	19,4	18,9	18,8	1515,7	1601,2	1390,6	1634,3

The data presented in Table 1 showed that in three years of study observations, annual average temperatures especially during the vegetation period were above the multi-values. Sunlight (amount of sunshine hours) recorded was higher values than multi-year value, except for year 2009. Compared to multiannual average, the precipitation during the vegetation period recorded a surplus in 2010 and 2011 and a substantial deficit in 2009, considered a dry year (table 2).

Table 2

Dinamic of precipitation during the study

Year Month	Precipitation (mm)			
	Multiannual	2008/2009	2009/2010	2010/2011
X	49,1	65,2	54,6	90,6
XI	31,6	25,2	49,2	23,8
XII	32,7	44,8	36,0	63,0
I	31,8	53,6	10,6	12,0
II	37,6	30,2	62,0	22,2
III	36,5	54,6	24,8	10,0
IV	47,5	17,6	24,4	35,6
V	72,3	35,8	117,0	80,2
VI	83,4	75,2	93,4	103,8
VII	73,8	30,8	139,4	147,0
VIII	59,1	5,0	47,2	34,8
IX	58,8	22,6	79,0	8,8
Annual sum	614,2	460,6	737,6	631,8
In vegetation period	394,9	187,0	500,4	410,2

The influence of the soil maintenance system on fertility characters of Gros Sauvignon variety, is summarized in table 3, as follows:

- Percentage of fertile shoots range from 63.60% to variant grassing with *Lolium perenne* (V2) and 72.53% in black field variant (V2);

- Coefficient of relative fertility (CFR) varies between 0.57 to variant grassing with *Lolium perenne* (V2) and 0.79 in black field variant (V1);

Table 3

The influence of the soil maintenance system on the percentage of the fertile shoot and fertility coefficient

Variant	Fertile shoots (%)			Coefficient of relative fertility (Cfr)		
	Val.	Dif.	Sem.	Val.	Dif.	Sem.
V1 – black field	72,53	3,50	*	0,79	0,09	*
V2 – grassing *Lolium p.*	63,60	-5,43	oo	0,57	-0,13	oo
V3 –grassing *Medicago s.*	70,87	1,84	-	0,73	0,03	-
Average exp.(Mt.)	69,03	0,00	-	0,70	0,00	-
DL 5%		2,5681			0,0849	
DL 1%		3,8888			0,1285	
DL 0,1%		6,2472			0,2605	

For the two indicators - percentage of fertile shoots and coefficient of relative fertility, compared with control variant (Mt) represented by average experience, black field variant (V1) showed a significant positive difference (3.50 and 0.09), and the variant grassing with *Lolium perenne* (V2) showed a distinct negative difference significant (-5.43 respectively -0.13).

Variant of grassing with *Medicago sativa* (V3) did not show significant differences from the average experience that control variant (Mt). The data obtained on the influence of the soil maintenance system on characteristics of grape production, summarized in table 4, is observed:

- Average number of grapes per vine varies from 15.37 to variant grassing with *Lolium perenne* (V2) and 22.51 to field black variant (V1);

- The average weight of the grape varies between 101.33 g of variant grassing with *Lolium perenne* (V2) and 161.67 g to black field variant (V1);

- Weight of 100 grains varies between 124.33 g of variant grassing with *Lolium perenne* (V2) and 159.33 g to black field variant (V1).

Table 4

The influence of the soil maintenance system on grape production characterics

Variant	Grapes								
	Average number/vine			Average weight (g)			Weight of 100 grains (g)		
	Val.	Dif.	S.	Val.	Dif.	S.	Val.	Dif.	S.
V1 – black field	22,51	3,48	*	161,67	24,00	**	159,33	18,00	**
V2 – grassing *Lolium perenne*	15,37	-3,66	o	101,33	-36,34	ooo	124,33	-17,00	oo
V3 –grassing *Medicago sativa*	19,33	0,30	-	150.33	12,66	-	141,00	-0,33	-
Average exp.(Mt.)	19,03	0,00	-	137,67	0,00	-	141,33	0,00	-
DL 5%		2,9995			14,7717			7,8544	
DL 1%		4,5421			22,3685			11,8939	
DL 0,1%		7,2967			35,9343			19,1071	

The interpretation of statistical and mathematical data in table 4, compared with control variant (experimental average), is observed:

- Variant grassing with *Lolium perenne* (V2) has significant differences in the negative, for the number of grapes per vine (-3.66), distinct differences significant negative for weight of 100 grains (-17.00), and differences very semnificative in a negative way for the average weight of the grape (-36.34);

- Variant black field (V1) showed positively significant differences for the number of grapes per vine (3.48) and positively distinct significant differences for mean weight of grapes (24.00) and weight of 100 grains (18 , 00);

- Variant grassing with *Medicago sativa* (V3) not shown significant differences for the parameters analyzed.

The data obtained on the influence of the soil maintenance system on grape production, summarized in table 5, it is noted that:

306

- Average yield on the vine is between 1.59 kg/vine for the variant grassing with *Lolium perenne* (V2) and 3.57 kg/vine for the black field variant (V1);
- Average production value per hectare ranges from 8.84 t / ha for variant grassing with *Lolium perenne* (V2) and 19.84 t / ha to field black variant (V1).

Table 5

Influence of the soil maintenance system on grape production

Variant	Grape production/vine (Kg)			Production evaluated (t/ha)		
	Val.	Dif.	S.	Val.	Dif.	S.
V1 – black field	3,57	0,90	**	19,84	5,00	**
V2 – grassing *Lolium p.*	1,59	-1,08	oo	8,84	-6,00	oo
V3 –grassing *Medicago s.*	2,85	0,18	-	15,83	0,99	-
Average exp.(Mt.)	2,67	0,00	-	14,84	0,00	-
DL 5%		0,4839			2,6789	
DL 1%		0,7328			4,0567	
DL 0,1%		1,1772			6,5169	

The statistical and mathematical interpretation of data recorded in Table 5, compared with control variant represented by experimental average, observed:
- Variant grassing with *Lolium perenne* (V2) show distinct differences significant negative for average production per vine (-1.08 kg) and estimated production per hectare (-6.00 t / ha);
- Variant black field (V1) show distinct differences significant positive for average production/vine (0.90 kg) and estimated production per hectare (5.00 t/ha).

The influence of the soil maintenance system on productivity indices (IPR-relative productivity index and IPA - absolute productivity index) and accumulated sugar content in grapes is presented in table 6.

Table 6

The influence of the soil maintenance system on productivity index and sugar content of grapes

Variant	Productivity index						Sugar content of grapes (g/l)		
	Ipr			Ipa					
	Val.	Dif.	S.	Val.	Dif.	S.	Val.	Dif.	S.
V1 – black field	134,87	31,90	**	247,17	37,50	**	196,03	-22,67	ooo
V2 – grassing *Lolium p.*	63,73	-39,24	oo	151,67	-58,00	oo	242,53	23,83	***
V3 –grassing *Medicago s.*	118,73	15,76	-	231,07	21,40	-	217,53	-1,17	-
Average exp.(Mt.)	102,97	0,00	-	209,67	0,00	-	218,70	0,00	-
DL 5%		16,3252			24,1005			7,8771	
DL 1%		24,7210			36,4950			11,9282	
DL 0,1%		39,7135			58,6280			19,1623	

307

Analyzing the data obtained it is found that:

- Value of the relative productivity index (IPR), ranges from 63.7 to variant on grassing with *Lolium perenne* (V2) and 134.87 to field black version (V1);

- Value of the absolute productivity index (IPA), ranges from 151.7 to variant grassing with *Lolium perenne* (V2) and 247.17 to field black version (V1);

- The sugar content of grapes ranges from 196.03 g / l to the variant field black (V1) and 242.53 g / l to the variant grassing with *Lolium perenne* (V2).

Analyzing the data obtained compared to the average experience (Mt) pointed out that:

- Variant black field (V1) show distinct differences significant positive for value of the relative productivity index (31.90) and value the absolute productivity index (37.50);

- Variant grassing with *Lolium perenne* (V2) show distinct differences significant negative for the both productivity indices.

The results obtained for the sugar content of grapes, to the variant black field (V1) show very significant differences in the negative (-22.67 g / l) than the average experience (Mt), while the variant grassing with *Lolium perenne* (V2) recorded very significant differences positive (23.50 g / l). Analysis of variance on the acidity of must (g / l), showed no statistical significance between the three soil maintenance systems.

The soil maintenance system variant grassing with *Medicago sativa* (V3) not significant differences from the variant control (Mt) or experimental average.

CONCLUSIONS

1. The soil maintenance system strongly influence characteristics the agro biological and productive of the variety;

2. Agro biological characteristics of the variety (fertile shoots, coefficients of fertility) and quantitative characteristics of grape production are adversely affected if the practice of variant grassing with *Lolium perenne* (V2);

3. A characteristic quality of grape production (sugar content) is positively influenced if applied the variant grassing with *Lolium perenne* (V2);

4. Variant grassing with *Medicago sativa* (V3), statistically similar experience average (Mt), provides an optimal balance between vegetative growth and quantitative and qualitative characteristics of grape production.

REFERENCES

1. Constantinescu Gh. si colab.., 1960 – *Ampelografia Republicii Populare Romane*, vol. III. Editura Academiei Republicii Populare Romane, Bucureşti;
2. Fergoni M., 2003 – *Il grande vinosi fa nel vigneto*. Il Sommellie, nr. 4;
3. Oslobeanu M. si colaboratorii, 1980 – *Viticultura generala si speciala*. Editura Didactica si Pedagogica, Bucureşti.
4. Schlamp H., 2001 – *Qualitatskonzepe beginnen im Weinberg*. Das Deutsche Weinmagazin, nr. 9-10.