SOIL MAINTENANCE SYSTEMS INFLUENCE UPON YIELD AND QUALITY IN CASE OF SOME VINE VARIETIES IN BUZIAS-SILAGIU VITICULTURAL CENTER CONDITIONS

INFLUENȚA SISTEMELOR DE ÎNTREȚINERE A SOLULUI ASUPRA PRODUCȚIEI ŞI CALITĂȚII LA CÂTEVA SOIURI DE VIȚĂ DE VIE ÎN CONDIȚIILE CENTRULUI VITICOL BUZIAŞ- SILAGIU

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Abstract: *Researches were made in Buzias-Silagiu viticultural center in 2006-2007 period and were focused on soil maintainance systems influence upon quantitative and qualitative yield in case of Cabernet Sauvignon, Pinot noir and Muscat Ottonel varieties.Soil maintenance was made using classic method, permanent grassing, plants cultivation as green fertilizer and herbicidation.Observations and determination were made on varieties and plots concerning grapes maturation, obtained yield, sugar content, acidity and gluco-acidimetric index was calculated.In case of all varieties the highest yield was obtained in case of soil maintenance using plants cultivation as green fertilizer, meanwhile highest sugar content was obtained in case of the plots maintened as black field.*

Rezumat: *Cercetările s-au desfăşurat în Centrul viticol Buziaş-Silagiu în anii 2006-2007 şi au vizat influenţa sistemelor de întreţinere a solului asupra producţiei cantitative şi calitative la soiurile Cabernet Sauvignon, Pinot noir şi Muscat Ottonel.Întreţinerea solului s-a făcut prin varianta clasică ogor negru, înierbare permanentă, cultivarea plantelor pentru îngrăşământ verde şi erbicidare.S-au făcut observaţii şi determinări separat pe soiuri şi variante în privinţa evoluţiei maturării strugurilor, producţia obţinută, conţinutul în zahăr, aciditate şi s-a calculat indicele gluco-acidimetric.La toate soiurile cea mai mare producţie a fost obţinută în cazul întreţinerii solului prin cultivarea plantelor pentru îngrăşământ verde, în timp ce conţinutul cel mai ridicat în zahăr s-a obţinut în cazul variantelor întreţinute ca ogor negru.*

Key words: *soil maintenance systems, variety of wine grapes, quality*
Cuvinte cheie :sisteme de intretinere, soiuri pentru vin, calitate

INTRODUCTION

In case of viticultural plantations soil maintenance requires year after year a great number of passings usind tractors and agricultural machines.

When soil humidity is to high or to low these passings with agricultural units may have negative influence upon soil phisical-chemical features.

So, permanent grassing, herbicidation and plants cultivation as green fertilizer are solutions which reasonably applied besides the fact that in their case fuel consumption, polution, maintenance costs are reduced, have also a favourable influence upon soil phisico-chemical features.

MATERIALS AND METHODS

Researches were made in the year 2006-2007 in a young vineyard which is on its first yields, located in Buzis-Silagiu viticultural center.

Planting distances are 2,2 m between rows and 1 m between vines /row and pruning type is Cordon Cazenave.

Varieties used in this experiment are : Cabernet Sauvignon, Pinot noir and Muscat Ottonel. Experimental plots were represented by different ways of soil maintenance: permanent grassing, herbicidation, plants cultivation as green fertilizer. As control was taken „black field" soil maintenance system, which is still the most practiced in Romania's vineyards.

Observations were made on varieties and plots concerning the obtained yield, sugar content, acidity content in g/l H_2SO_4 and gluco-acidimetric index was calculated.

RESULTS AND DISCUSSION

The year 2006 was a year which provided not so favorable climacteric conditions for vine, with abundant rainfall in vine blossoming period and during grapes maturation. Having in mind these reasons, the obtained yields were under varieties and culture area's potential.

In case of all studied varieties, the highest yields were obtained when soil maintenance system in the plot was the one of plants cultivated as green fertilizer (winter fodder) which were reaped and incorporated in soil.

Registered differences to the control were of 595 kg/ha in case of Cabernet Sauvignon variety, of 755 kg/ha in case of Pinot noir variety and of 690 kg/ha in of Muscat Ottonel variety, differences having statistical covering.

The only plot which registered values inferior to the control was soil maintenance through permanent grassing, but registered differences weren't statistical covered (Table 1).

In the year 2007 (Table 2), climatic conditions were more favorable for vine necessities (reduced rainfall and abundant sun shining hours), so the obtained yields were superior to the last year ones. This year also, the highest yields were obtained in case of soil maintenance system using permanent grassing, the obtained differences to the control being smaller given the previous year.

The average results obtained on research cycle (Table 3) showed that the highest yields were obtained when green fertilizers were used, the outputs given the control being of 497 kg/ha in case of Cabernet Sauvignon variety, 657 kg/ha in case of Pinot noir variety and 624 kg/ha in case of Muscat Ottonel variety; also they were statistical covered.

Permanent grassing lead to the obtaining of some slightly inferior productions given the control and that is way permanent grassing is still studied before a conclusion to be made.

Regarding soil maintenance system influence upon yield quality, differences to the control were less obvious, still we can see that in case of both research years all the plots registered inferior values given the control (Tables 4, 5 and 6).

Average speaking, the lowest sugar content was registered when green fertilizers were used, differences to the black field vary between -7.5 and -9 g/l sugar. Yield quality was very good in case of all studied varieties, sugar content was high, and acidity maintained its equilibrium, all that allowing to the studied varieties to join superior varieties category.

Table 1

The obtained yield in the year 2006 given soil maintenance systems

Variety	Soil maintenance systems				Average	Difference to the control			Significance		
	Black field (Control)	Herbicidation	Green fertilizers	Permanent grassing		Herbicidation	Green fertilizers	Permanent grassing	Herbicidation	Green fertilizers	Permanent grassing
Cabernet Sauvignon	6930	7140	7525	6786	7095,25	+210	+595	-144	-	*	-
Pinot noir	6175	6635	6930	5915	6413,75	+460	+755	-260	*	**	-
Muscat Ottonel	7425	7920	8115	7205	7666,25	+495	+690	-220	*	**	-

Cabernet Sauvignon DL 5% = 273,4 DL 1% = 531,2 DL 0,1% =928,1
Pinot noir DL 5% = 263,2 DL 1% = 512,1 DL 0,1% =837,2
Muscat Ottonel DL 5% =298,1 DL 1% = 601,3 DL 0,1% = 1072,3

Table2

The obtained yield in the year 2007 given soil maintenance systems

Variety	Soil maintenance systems				Average	Difference to the control			Significance		
	Black field (Control)	Herbicidation	Green fertilizers	Permanent grassing		Herbicidation	Green fertilizers	Permanent grassing	Herbicidation	Green fertilizers	Permanent grassing
Cabernet Sauvignon	8120	8215	8520	7925	8195	+95	+400	-195	-	*	-
Pinot noir	7110	7305	7530	6970	7228,75	+195	+420	-140	-	*	-
Muscat Ottonel	8730	8715	9010	8452	8726,75	-15	+280	-278	-	-	-

Cabernet Sauvignon DL 5% = 279,6 DL 1% =551,1 DL 0,1% =1002,3
Pinot noir DL 5% =284,2 DL 1% =598,3 DL 0,1% =972,1
Muscat Ottonel DL 5% = 301,7 DL 1% =615,8 DL 0,1% = 1131,2

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Table 3

The obtained yield given soil maintenance systems – average of the years 2006-2007

Variety	Soil maintenance systems				Average	Difference to the control			Significance		
	Black field (Control)	Herbicidation	Green fertilizers	Permanent grassing		Herbicidation	Green fertilizers	Permanent grassing	Herbicidation	Green fertilizers	Permanent grassing
Cabernet Sauvignon	7525	7677,5	8022,5	7355,5	7645,125	+152,5	+497,5	-169,5	-	*	-
Pinot noir	6642,5	6970	7230	6442,5	6821,25	+397,5	+657,5	-200	*	**	-
Muscat Ottonel	8077,5	8317,5	8562,5	7828,5	8196,5	+379	+624	-249	*	**	-

Cabernet Sauvignon DL 5% = 276,1 DL 1% = 541,2 DL 0,1% =947,1

Pinot noir DL 5% =269,1 DL 1% = 536,1 DL 0,1% =874,1

Muscat Ottonel DL 5% =296,2 DL 1% = 599,2 DL 0,1% = 1094,3

Table 4

Yield quality given soil maintenance systems in the year 2006

Soil maintenance systems	Variety	Sugar (g/l)	Acidity (g/l H_2SO_4)	Glucoacidimetri index	Difference to the control (sugar g/l)	Significance
Black field (Control)	Cabernet Sauvignon	188	4,7	40	-	-
	Pinot noir	192	4,8	40	-	-
	Muscat Ottonel	186	3,7	50,27	-	-
Herbicidation	Cabernet Sauvignon	183	4,8	38,125	-5	-
	Pinot noir	188	4,9	38,36	-4	-
	Muscat Ottonel	183	3,8	48,15	-3	-
Green fertilizers	Cabernet Sauvignon	180	4,9	36,73	-8	0
	Pinot noir	185	4,8	38,54	-7	0
	Muscat Ottonel	178	3,9	45,64	-8	0
Permanent grassing	Cabernet Sauvignon	182	4,8	37,91	-6	0
	Pinot noir	187	4,8	38,95	-5	-
	Muscat Ottonel	180	3,8	47,36	-6	0

Cabernet Sauvignon DL 5% =5,31 DL 1% = 8,16 DL 0,1% =13,97

Pinot noir DL 5% = 5,79 DL 1% = 8,75 DL 0,1% =15,2

Muscat Ottonel DL 5% =4,71 DL 1% =7,02 DL 0,1% =12,17

Table 5

Yield quality given soil maintenance systems in the year 2007

Soil maintenance systems	Variety	Sugar (g/l)	Acidity (g/l H_2SO_4)	Glucoacidimetri index	Difference to the control (sugar g/l)	Significance
Black field (Control)	Cabernet Sauvignon	197	4,3	45,81	-	-
	Pinot noir	205	4,1	50	-	-
	Muscat Ottonel	195	3,3	59,09	-	-
Herbicidation	Cabernet Sauvignon	192	4,6	41,73	-5	-
	Pinot noir	203	4,2	48,33	-2	-
	Muscat Ottonel	191	3,5	54,57	-4	-
Green fertilizers	Cabernet Sauvignon	190	4,7	40,42	-7	0
	Pinot noir	194	4,6	42,17	-11	0
	Muscat Ottonel	188	3,6	52,22	-7	0
Permanent grassing	Cabernet Sauvignon	191	4,6	41,52	-6	-
	Pinot noir	196	4,7	41,70	-9	0
	Muscat Ottonel	190	3,5	54,28	-5	-

Cabernet Sauvignon	DL 5% = 6,12	DL 1% =9,78	DL 0,1% =17,2
Pinot noir	DL 5% = 7,89	DL 1% =11,6	DL 0,1% =19,2
Muscat Ottonel	DL 5% =5,91	DL 1% = 8,93	DL 0,1% = 14,41

Yield quality given soil maintenance systems in the year - 2006-2007 average *Table 6*

Soil maintenance systems	Variety	Sugar (g/l)	Acidity (g/l H_2SO_4)	Glucoacidimetri index	Difference to the control (sugar g/l)	Significance
Black field (Control)	Cabernet Sauvignon	192,5	4,5	42,77	-	-
	Pinot noir	198,5	4,45	44,60	-	-
	Muscat Ottonel	190,5	3,5	54,42	-	-
Herbicidation	Cabernet Sauvignon	187,5	4,7	39,89	-5	-
	Pinot noir	195,5	4,55	42,96	-3	-
	Muscat Ottonel	187	3,65	51,23	-3,5	-
Green fertilizers	Cabernet Sauvignon	185	4,8	38,54	-7,5	0
	Pinot noir	189,5	4,7	40,31	-9	0
	Muscat Ottonel	183	3,75	48,80	-7,5	0
Permanent grassing	Cabernet Sauvignon	186,5	4,7	39,68	-6	0
	Pinot noir	191,5	4,75	40,31	-7	0
	Muscat Ottonel	185	3,65	50,68	-5,5	-

Cabernet Sauvignon	DL 5% =5,69	DL 1% =8,75	DL 0,1% =15,4
Pinot noir	DL 5% =6,75	DL 1% = 9,73	DL 0,1% =16,97
Muscat Ottonel	DL 5% =5,57	DL 1% =8,01	DL 0,1% = 13,03

CONCLUSIONS

Soil maintenance in viticultural plantations represents a very complex problem due to the large number of works necessary but also to variable climate conditions, which made almost impossible soil working in the period and to the most propitious moment.

Increased fuel cost and phisico-chemical features of the viticultural soils imposed the fact that some alternatives must to be found given the classic soil maintenance system method.

In Buzias-silagiu viticultural center conditions and given the conditions of the two researched years, which had their own profile, we may assert that the best results were obtained when plants were used as green fertilizers.

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