RESEARCHES ON PRACTICING THE DIFFERENTIATED PRUNING IN CONJUNCTION WITH THE AGROBIOLOGIC FEATURES OF THE VARIETY AND THE ECOLOGICAL RESOURCES OF THE AREA OF CULTURE

Mălăescu Mihaela *, Dobrei Alin*, Ghiţă Alina *, Cristea Teodor*

Keywords: the vigor, fertility, productivity, differentiated pruning

ABSTRACT

The obtaining of superior yields, typical for varieties and area of culture depends on knowing the technological and agrobiologic characteristics of varieties, but also on the application of some technologies which are specific to each variety.

In order to obtain high-quality wines is very important for the production to be balanced in terms of quality and quantity. This paper regards the vigor, fertility and productivity of the Fetească regală, Fetească albă, Muscat Ottonel and Burgund varieties in terms of applying of differentiated pruning.

The experimental variants consist in applying fructification pruning differentiated under the form of equal fruit loads but applied on different elements of fructification: short canes and long canes.

INTRODUCTION

The fructification pruning is one of the most important works in the grapevine technology of culture and, at the same time, the most difficult to apply, with a high labor consumption.

The pruning methods and the training forms of the grapevine have evolved a lot in the recent years; the viticulturists are trying to adopt the simplest solutions in order to facilitate the other works.

When applying these pruning, the genetic characteristics of the variety and the climatic conditions during the bud differentiation should be taken into account.

MATERIAL AND METHODS

The study was conducted during 2007-2008 in the vineyard of the Timisoara Didactic Resort from U.S.A.M.V.B.T. The studied varieties: Fetească regală, Fetească albă, Muscat Ottonel and Burgund are aged over 15 years, are grafted onto the Berlandieri x

* ***Banat University of Agricultural Sciences and Veterinary Medicine, Timişoara***

Riparia Kober 5BB rootstock and the planting distances are 2 x 1.2 m, the density being 4166 logs/ha .

Because the training form specific to vineyards of the Timişoara Didactic Resort is the semi-tall, the following pruning types, were applied on the varieties:

V 1-30 buds assigned to short canes
V 2-30 buds assigned to long canes
V 3 - 40 buds assigned to short canes
V 4 - 40 buds assigned to long canes
V5 - 50 buds assigned to short canes
V6 - 50 buds assigned to long canes

During the researches we conducted observations and measurements on logs vigor, fertility and productivity, the quantity and quality of yields. The annual growths were measured; the shoots and inflorescences were counted. The foliar surface calculation was done by weighting using the round-pieces method. Sugar determination was made by refractometry.

RESULTS AND DISCUSSIONS

The estimation of logs' vigor was done by measuring the annual growths and determining the foliar surface.

The foliar surface and obtained production are closely related, because the accumulation of organic substances in the grape-berries is based on photosynthesis. Foliar surface is specific to each variety, but is influenced by both the pedoclimatic conditions and the technology of culture.

Foliar surface grew along with the fruit load. At equal fruit loads, foliar surface is greater if at the pruning long elements of fructification are left on the log (long canes).

After measuring annual growths, we have observed that at the Fetească regală variety, the V3 variant had the highest percentage of maturated growths of 94.95%, while the V2 variant had the lowest percentage of 88.98%.

At the Fetească albă variety, we observed the lowest percentage of maturated wood of 83.65% at the V2 variant and the highest percentage at the V6 variant of 95.75%.

Muscat Ottonel variety has the highest matured wood percentage between 88.82% (V2) and 93.44 (V6).

82.97% at the V3 variant is the lesser value of maturated wood at Burgund variety, and the highest value was obtained at V1 variant, 93.46%.

At the Fetească regală variety as compared to the V1 variant – the control variant, the V6 variant after analyzing the variance had a very significant positive significance.

At the Fetească albă variety the V6 variant had recorded as compared to V1 – control variant a very significant positive value.

The Muscat Ottonel variety had recorded significantly positive values next to the control at the V4, V5, V6 variants.

Positive significations were also obtained at the Burgund variety at V5 and V6 variants.

In order to determine the logs' fertility and productivity, the fertility and productivity coefficients and indexes were calculated.

Comparing the studied varieties we observed that the best fertility was registered at the Muscat Ottonel variety and the lowest at the Fetească albă variety.

The best percentage of fertile shoots was at: the Fetească regală, V5 variant - 82.2%; Fetească albă, V2 variant - 73.6%; Muscat Ottonel, V3 variant - 93.4% and Burgund, V5 variant - 83.6% .

Absolute productivity index had the highest values at the variants: V5 - Fetească regală - 253.4; V4 - Fetească albă - 232.5; V3 - Muscat Ottonel - 180; V4 - Burgund - 300.8

Table 1

Logs' vigor (2007-2008 average)

Variety	Variant	Total annual growths (m/log)	Maturated growths		Foliar surface (m^2/log)	Difference to the control (m^2/log)	Significance
			m/log	% from total			
Fetească regală	V1(ct)	16,40	15,02	91,58	4,25	-	-
	V 2	16,97	15,10	88,98	4,40	+0,15	-
	V 3	17,06	16,20	94,95	4,48	+0,23	*
	V 4	17,30	16,15	93,35	4,60	+0,35	*
	V 5	17,50	16,30	93,14	4,62	+0,37	*
	V 6	18,02	16,94	94,00	4,88	+0,63	**
DL5%=0,23 DL1%=0,41 DL0,1%= 0,97							
Fetească albă	V1(ct)	21,02	18,70	88,96	7,40	-	-
	V 2	20,62	17,25	83,65	7,56	+0,16	-
	V 3	20,11	18,16	90,30	8,35	+0,95	**
	V 4	20,17	17,80	85,99	8,52	+1,12	**
	V 5	19,89	17,55	88,23	8,78	+1,38	**
	V 6	19,30	18,48	95,75	8,96	+1,56	***
DL5%= 0,37 DL1%= 0,79 DL0,1%=1,55							
Muscat Ottonel	V1(ct)	14,30	13,09	91,53	3,40	-	-
	V 2	14,95	13,28	88,82	3,68	+0,28	-
	V 3	14,80	13,35	90,20	3,65	+0,25	-
	V 4	15,15	14,02	92,54	3,74	+0,34	*
	V 5	15,30	14,10	92,15	3,78	+0,38	*
	V 6	16,03	14,98	93,44	3,96	+0,56	*
DL5%= 0,31 DL1%=0,72 DL0,1%= 1,43							
Burgund	V1(ct)	19,27	18,01	93,46	5,15	-	-
	V 2	18,49	15,90	85,99	5,20	+0,05	-
	V 3	18,21	15,11	82,97	5,32	+0,17	-
	V 4	18,14	16,89	93,10	5,34	+0,19	-
	V 5	18,00	15,40	85,55	5,48	+0,33	*
	V 6	17,80	16,38	92,02	6,02	+0,87	**
DL5%=0,28 DL1%= 0,58 DL0,1%= 1,23							

Finally we present data on the quantity and quality of grape production. At the Fetească regală variety, V5 variant has the highest production, having as compared to the control variant a very significant positive value.

The Fetească albă variety recorded at the V4 variant a distinctly significant positive production from the control.

At Muscat Ottonel, V3 variant has a distinctly significant positive value next to the control's production and the V6 variant has a negative significance.

At the Burgund variety, significant positive yields experienced the V4, V5 and V6 variants.

We estimated the quality of production on the sugar and acidity content. We noticed as very qualitative the varieties Burgund and Muscat Ottonel, which have sugar values over 190 g/l at all tested variants.

Table 2

Logs' fertility and productivity (2007-2008 average)

Variety	Variant	Fertile shoots (%)	Fertility coefficients		Medium weight of a grape (g)	Productivity index	
			relative	absolute		relative	absolute
Fetească regală	V 1	75,1	1,15	1,29	142	163,30	183,18
	V 2	76,2	1,22	1,40	145	176,90	203,00
	V 3	75,9	1,26	1,36	134	168,84	182,24
	V 4	77,1	1,29	1,47	137	176,73	201,39
	V 5	82,2	1,44	1,81	140	201,60	253,40
	V 6	80,8	1,38	1,72	138	190,44	237,36
Fetească albă	V 1	71,2	1,12	1,32	118	132,16	155,76
	V 2	73,6	1,24	1,46	104	128,96	151,84
	V 3	70,9	1,54	1,62	120	184,80	194,40
	V 4	70,2	1,61	1,86	125	201,25	232,50
	V 5	68,5	1,55	1,78	112	173,60	199,36
	V 6	66,8	1,58	1,80	110	173,80	198,00
Muscat Ottonel	V 1	90,2	1,39	1,45	98	136,22	142,10
	V 2	93,0	1,48	1,53	96	142,08	146,88
	V 3	93,4	1,72	1,80	100	172,00	180,00
	V 4	92,1	1,64	1,71	95	155,80	162,45
	V 5	88,8	1,25	1,32	88	110,00	116,16
	V 6	88,0	1,18	1,24	90	106,20	111,60
Burgund	V 1	76,8	1,20	1,35	120	144,00	162,00
	V 2	78,6	1,29	1,43	147	189,60	210,21
	V 3	81,0	1,70	1,74	151	256,70	262,74
	V 4	82,4	1,76	1,88	160	281,60	300,80
	V 5	83,6	1,67	1,75	158	263,86	276,50
	V 6	83,0	1,71	1,80	155	265,05	279,00

At the Fetească albă variety we noticed a larger quantity of sugar in the case of variants with a smaller load of fructification, but V3 and V4 variants have a balance between production and quality. 2007 and 2008 being favorable for the cultivation of vines, also determined the obtaining of superior qualitative productions at the Fetească regală variety.

Table 3

Quantitative and qualitative production (2007-2008 average)

Variety	Variant	Production (kg/ha)	Sugar (g/l)	Acidity (g/l H_2SO_4)	Alcoholic degree (% vol.)	Difference to the control (kg/ha)	Signifi cance
Fetească regală	V 1(ct)	7545	185	5,4	10,8	-	-
	V 2	8998	186	5,5	10,9	+1453	-
	V 3	10207	182	5,3	10,7	+2662	*
	V 4	10869	184	5,4	10,8	+3324	**
	V 5	13582	183	5,2	10,7	+6037	***
	V 6	11491	180	5,2	10,5	+3946	**
DL5%=1667 DL1%=3125 DL0,1%= 5749							
Fetească albă	V 1(ct)	6458	197	4,8	11,5	-	-
	V 2	7583	202	4,9	11,8	+1125	-
	V 3	8124	199	4,7	11,7	+1666	*
	V 4	9166	195	4,8	11,4	+2708	**
	V 5	8749	191	5,0	11,2	+2291	*
	V 6	8624	188	5,1	11,0	+2166	*
DL5%=1333 DL1%=2708 DL0,1%= 5498							
Muscat Ottonel	V 1(ct)	9571	200	3,8	11,7	-	-
	V 2	10100	198	3,8	11,6	+529	-
	V 3	13200	192	3,6	11,2	+3629	**
	V 4	11030	196	3,6	11,5	+1459	-
	V 5	8126	195	4,0	11,4	-1445	-
	V 6	7290	196	4,1	11,5	-2281	0
DL5%=1665 DL1%= 3541 DL0,1%=6905							
Burgund	V 1(ct)	10800	200	4,5	11,7	-	-
	V 2	11120	202	4,4	11,8	+320	-
	V 3	11400	197	4,3	11,5	+600	-
	V 4	12300	198	4,4	11,6	+1500	*
	V 5	12044	198	4,6	11,6	+1244	*
	V 6	11980	196	4,3	11,5	+1180	*
DL5%=1124 DL1%=2207 DL0,1%= 4499							

CONCLUSIONS

Foliar surface at the studied varieties ranged within the normal limits, the highest values were recorded at the variants with big fruit loads.

At Fetească regală and Burgund varieties the optimal fertility and productivity have been observed at the variants with the fruit load of 50 buds, distributed on short canes.

Muscat Ottonel variety presents a good fertility at a fruit load of 40 buds distributed on short canes, and the Fetească albă variety prefers a moderate fruit load, distributed on long fructification elements (long canes).

Between fertility, productivity and actual production there isn't always a direct correlation.

In all the years of research, production quality was good on all varieties.

The differences recorded between varieties reflect their genetic potential.

The researches which formed the basis of obtaining these results were funded by CNCSIS Bucharest project: Development of some models of advanced viticultural technologies in accordance with the pedoclimatic conditions, the varietal assortments and sustainable viticulture principles, ID-1128, 2007-2010.

REFERENCES

1. A. Dobrei, L. Rotaru, S. Morelli, Ampelografie, Ed, Solness, Timişoara, 2008

2. A. Dobrei, Mihaela Mălăescu, Rodica Dărăbuş, Alina Ghiţă, T. Cristea, Ampelografie- Lucrări pratice, Ed. Waldpress, Timişoara, 2007

3. A. Dobrei, L. Rotaru, M Mustea, Cultura viţei de vie, Ed. Solness Timişoara, 2005

4. Dobrei A., Iova Gh., Dărăbuş Rodica, Mălăescu Mihaela, Les recherches concernand la fertilite et la productivite de quelque cepages de vigne cultive dans la Station Didactique du Timisoara, Cercetări ştiinţifice seria a VI-a, Facultatea de Horticultură, Ed. Agroprint, Timisoara, 2002

5. Iova GH., Dobrei A., Kolcsar Kiss Katalin, Cercetări privind influenţa repartizării sarcinii de rodire asupra creşterii şi fructificării la soiul Fetească regală, Cercetări ştiinţifice seria a III-a, Facultatea de Horticultură, Ed. Agroprint, Timisoara, 1999