CLONAL SELECTION OF PROKUPAC GRAPE VARIETY IN SERBIA-CURRENT RESULTS

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ABSTRACT

The research carried out in experimental vineyard-collection at Faculty of Agriculture experimental field "Radmilovac". Vineyard collection belongs to Šumadijsko-velikomoravski vineyard area, Belgrade sub-region and Grocka vineyard region. Rows were extending in southeast-northwest direction with line spacing of 3 m and 1 m between vines in row. In paper is presented data for 25 clones of Prokupac red vine variety (mechanical composition of berries and cluster, structural indicators of berries and bunches and qualitative parameters-sugar and acid content). Based on structural indicators, clones are grouped into 3 large groups. Clones 43/8 (284.46 g), 42/1 (232.93 g), 40/5 (239.9 g) and 40/2 (244.77 g) were emphasized by the largest cluster mass. With sugar content, clones 42/1 (23.6%), 43/5 (22.9%) and 43/6 (22.8%) were excluded.

INTRODUCTION

Prokupac is a variety known since ancient times, and has lot of synonyms: Rskavac, Kameničarka, Crnka, Nikodimka, Niševka, Skopsko crno (Makedonija), Zarčin (Bugarska). Prokupac is characterized with big yielding capacity. Bunch is medium large, cylindrical or conical in shape, medium compact, berries are round or slightly oval with dark blue epidermis. Prokupac wine is refreshing and nicely red colored (Avramov, 2001; Zunic, 2010).

Autochthonous variety and wines made from autochthonous varieties have become an inevitable segment of a big number of wineries in recent years. World wine market is very dynamic and clearly recognizes importance of autochthonous varieties. It is undoubtedly that Prokupac is the most important autochthonous variety of Serbia, which was recognized wineries and became integral part of regular production. During the last decade, numerous vineyards in central, eastern and southeastern Serbia based wine production on Prokupac variety, which is beside international varieties most common in our country (Markovic et al., 2013).

First information about Prokupac clonal selection was wrote by Zirojević (1964). Through clonal selection were separate clones with different morphological and technological characteristics. After few year research peiod 11 clones were recognized by the Ministry of Agriculture as a technologically better clones compared to the standard variety and they are expanding into further production.

In Prokupac clonal selection main aims was continuously yield, optimum berry skin/mesocarp indicator, better grape quality express through sugar and acid content, stronger wine aroma and coloration, as well as genetic resistance to main pests and diseases. Clones can produce wines with different organoleptic characteristics, aromatic profile and phenolic content which can be affected directly by mechanical grape composition.

MATERIALS AND METHODS

For purposes of ampelographic composition of berries and clusters were selected ten vines from which was harvested ten representative clusters which are subjected. After clusters selecting it was measured their individual weight, length and width after which was carefully separate each berry from cluster stem without meat rest. With measuring on analytical balance was determined cluster mass, mass of all beres on cluster and cluster stem weight. Berries number was determined by counting. After that was selected 100 berries from which was separated epidermis and seeds. The seeds and epidermis mass was measured on an analytical balance. Seeds number was determined by counting. Other parameters represent in table 1 were obtained by computation.

The grapes quality was expressed through sugar and total acid content in grape jus. Sugar content in grape jus was determined by Oeshle mostwage and values were determined using Dujardin-Salleron tables. Total acid content was determined by titration method with n/4 NaOH. Results shown are average of three-year research. For data analysis software IBM SPSS Statistics 2.0, Chicago, IL, USA was used.

RESEARCH RESULTS

The values of parameters of ampelographic composition of clusters and berries are shown in table 1.

Table 1.

Ampelographic composition of Prokupac clones bunch and berry

Clone	Bunch length	Bunch width	Number of berries per bunch	Bunch weight	Bunch structure		Number of seeds per berry	Seed weight	Berry weight	Berry structure		
					% of bunch stem	% of berry				% of berry skin	% of seed	% of berry meet
40/1	13.83	7.87	93.60	190.36	4.04	95.96	1.46	0.042	2.4	5.13	2.50	92.38
40/2	14.66	9.99	111.78	244.77	3.67	96.33	1.27	0.040	2.18	4.59	2.11	93.30
40/3	14.53	8.12	94.51	217.92	3.89	96.11	1.75	0.039	2.47	4.86	2.55	92.59
40/4	13.45	9.20	115.60	261.93	4.36	95.64	1.36	0.035	2.42	5.08	1.90	93.02
40/5	14.50	9.13	110.40	239.90	3.92	96.08	1.51	0.038	2.4	5.54	2.50	91.96
40/6	14.85	8.05	86.70	188.17	4.29	95.71	1.58	0.038	2.00	6.50	3.15	90.35
40/7	14.09	7.83	91.84	222.28	3.23	96.77	1.75	0.039	2.62	5.57	2.52	91.91
40/8	13.50	7.60	93.47	203.75	3.37	96.63	1.76	0.042	2.78	4.89	2.52	92.59
41/1	15.54	8.24	96.93	263.34	3.17	96.83	1.84	0.040	2.63	4.41	2.66	92.93
41/2	12.10	6.64	77.13	180.52	3.49	96.51	1.73	0.044	2.52	5.79	2.62	91.59
41/3	13.38	7.69	92.80	211.19	5.30	94.70	1.98	0.040	2.77	5.42	2.64	91.95
41/4	12.70	7.40	87.90	194.73	4.23	95.77	1.79	0.036	2.35	5.53	2.98	91.49
41/6	13.90	8.14	73.22	210.09	3.90	96.10	1.73	0.039	2.28	4.82	2.46	92.72
42/1	12.56	7.54	99.09	232.93	3.36	96.64	1.70	0.047	2.60	5.77	2.92	91.31
42/2	12.94	7.81	99.69	170.37	4.72	95.28	1.52	0.038	2.17	5.39	2.30	92.30
42/3	12.87	8.19	99.89	220.92	3.84	96.16	1.54	0.037	2.33	5.15	1.55	93.30
42/4	12.24	6.93	94.11	199.66	3.78	96.22	1.62	0.040	2.22	5.41	2.70	91.89

43/1	13.09	7.37	89.29	217.13	3.33	96.67	1.45	0.037	2.53	4.86	1.34	93.79
43/2	14.36	6.84	88.76	188.50	3.05	96.95	3.28	0.035	2.17	3.50	2.23	94.27
43/3	14.80	8.20	103.30	220.52	2.73	97.27	1.68	0.042	2.73	4.76	2.56	92.67
43/4	12.67	10.24	98.76	207.59	3.60	96.40	1.70	0.035	2.37	4.35	2.36	93.29
43/5	12.90	6.80	87.84	194.02	3.27	96.73	1.98	0.037	2.65	5.40	2.75	91.85
43/6	13.24	6.40	98.44	217.70	3.24	96.76	1.60	0.036	2.5	3.84	2.40	93.76
43/7	14.02	6.62	93.11	207.12	3.11	96.89	1.89	0.039	2.47	4.98	2.96	92.06
43/8	13.00	8.08	131.04	284.46	2.97	97.03	1.75	0.035	2.51	3.43	2.23	94.34
CV	6.69	12.44	12.38	12.67	16.16	0.62	21.30	7.83	8.28	14.27	16.91	1.04

Variation values of parameters of mechanical analysis of cluster and berry were shown through coefficient of variation that varied in a wide range (0.62-1.91). The smallest variation of 0.62 was recorded for % of berries in cluster, with the highest variation (16.91) was recorded for % of seeds in the berry. In addition to this parameter, the high value of coefficient of variation (16,16) was also determined for % of stem in the cluster. A high percentage of variation (14,27) was determined for % of berry skin, clusters mass (12,67), cluster width (12,44) and number of berries in the cluster (12,38).

Cluster weight varied from 170.37-284.46 g. The smallest cluster mass was recorded for clone 42/2 (170.37 g), while the largest mass had clone 43/8 (284.46 g). Big clustera was also founded for clones 42/1 (232.93 g), 40/5 (239.9 g), 40/2 (244.77 g), 40/4 (261.93) and 41 / 1 (263.34 g). Except clone 42/2 with a small clusters mass was clones 41/2 (180.52 g), 40/6 (188.17 g) and 40/1 (190.36 g). The results are shown in graph 1. Results are according to Markovic et al. (2017) and Zivkovic et al. (2016).
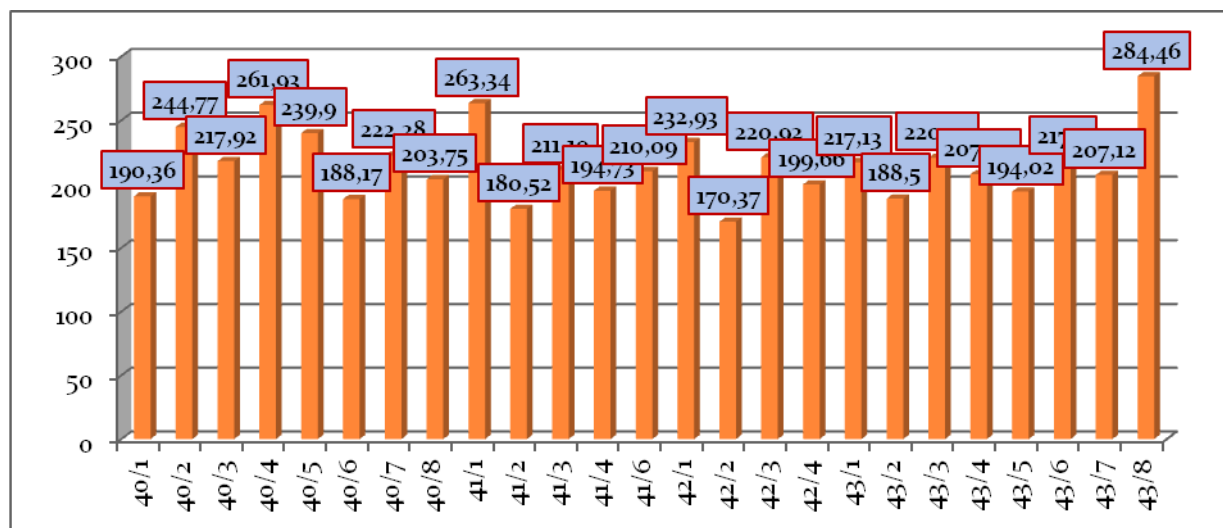
Graph 1. Cluster mass (g)

On basis of presented values of ampelographic composition of clusters and berry, Prokupac clones are grouped into 3 groups. Groups were formed on basis of the similarity of a large number of examined characteristics. In each group was expressed divergence of clones or subgroups of similar characteristics. The affinity of each of the examined clones to a group and subgroup is shown in graph 2.
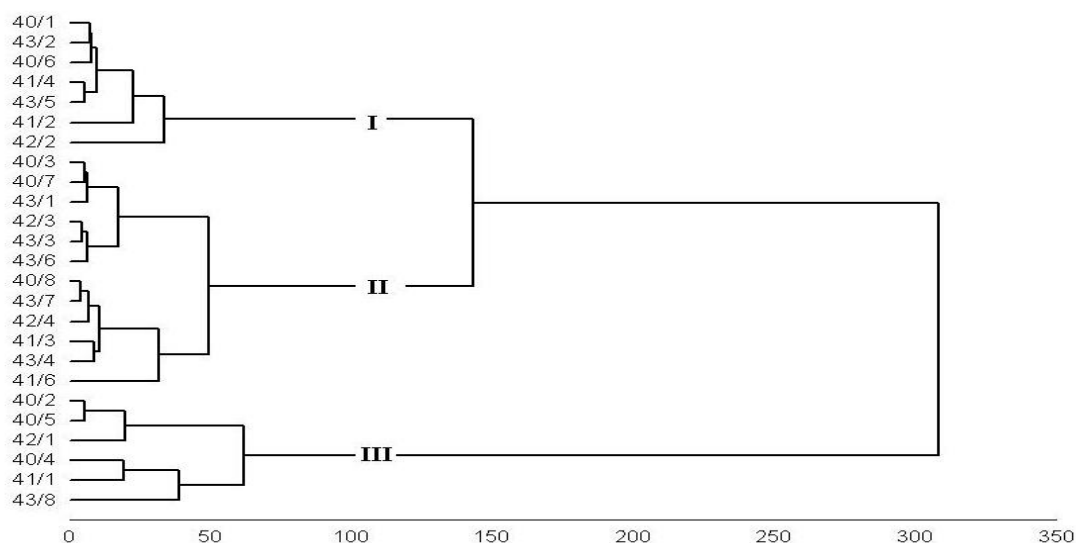
Graph 2. Cluster dendrogram for 25 Prokupac clones

Qualitative parameters of cluster and berries are presented in paper through sugar and total acids content in grape jus-must. Clones 42/1 (23.6%), 43/5 (22.9%) and 43/6 (22.8%) were the highest values of sugar content in must. Clones 41/1 and 41/3 research had approximately same sugar content in must (20.3%). Clones with the lowest sugar content were 41/4 (19.1%), 40/8 (19.3%), 43/8 (19.6%) and 40/4 (19.9%). During research, most clones accumulated a high percentage of sugar, which means high potential that Prokupac clones are placed in ranking for production of hihg quality wines. That have big scientific importance and importance for viticulture practice, especially if it has to be noted that removal of clusters from was not carried out during the research.
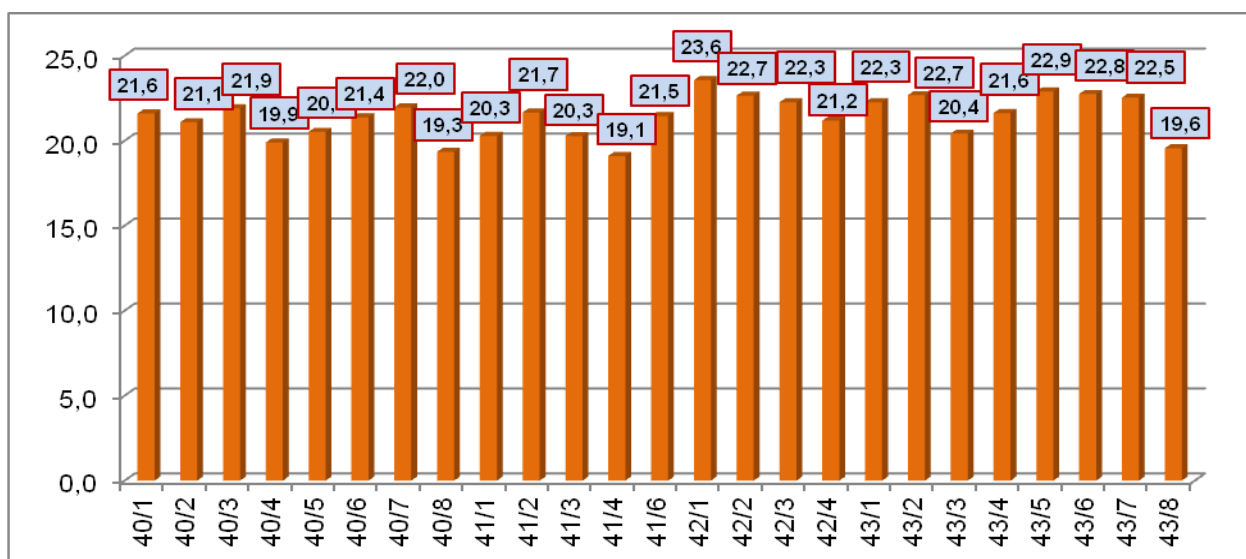

Graph 3. Sugar content in must (%)

Values of total acids expressed as tartaric acid in must varied widely (ranging from 5.34-8.53 g/l). The lowest values of total acid content were recorded in the must of clone 42/1 (5.34 g/l). Lower values were also recorded for clones 43/4 (5.37 g/l)

and 42/3 (5.67 g/l). On the other hand, clones 41/4, 40/4 and 40/5 had the highest recored total acid content (8.12 g/l, 8.38 g/l and 8.53 g/l). Result are according to Markovic et al. (2012) and Markovic et al. (2013b).
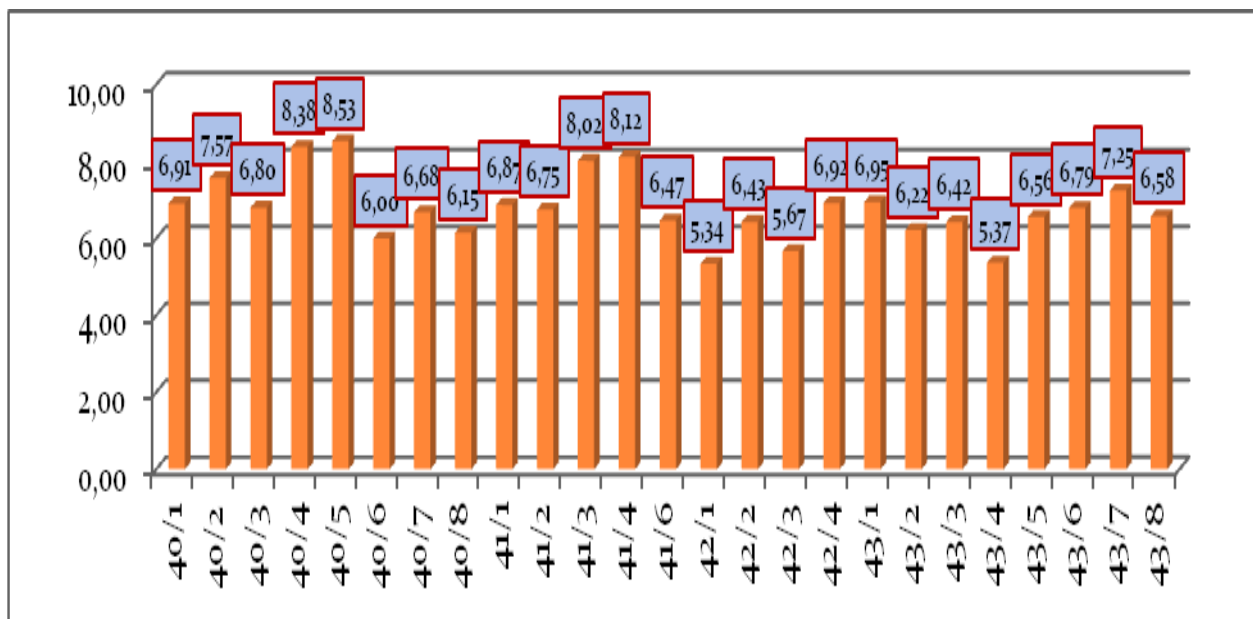
Graph 4. Total acid content in must (g/l)

CONCLUSION

Based on research result following conclusions can be drawn:
- parameters of ampelographic analysis of clusters and berries are shown thgrough variation coefficient that varied in a wide range (0.62-1.91);
- minimum variation founded for % of berries in cluster, % of seed in the berry and % of stem in cluster. A high percenta of variation was determined for % berry skin, cluster mass, cluster width and number of berries in cluster;

- the smallest cluster mass was recorded for clone 42/2, while the largest mass had clone 43/8. Clusters of clone 42/1, 40/5, 40/2, 40/4 and 41/1 were registred by majority of clusters.
- the highest values of sugar content in must had clones 42/1, 43/5 and 43/6, while the highest content of total acids was observed for clones 41/4, 40/4 and 40/5. On basis of obtained results, separated Prokupac clones can be classified into clones for the production of high quality wines.

ACKNOWLEDGEMENTS

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