DOI: 10.52846/bhfe.26.2021.24

ANNALS OF THE UNIVERSITY OF CRAIOVA

Series: ✓*Biology*
✓*Horticulture*
✓*Food products processing technology*
✓*Environmental engineering*

Vol. XXVI (LXII) - 2021

QUANTITATIVE AND QUALITATIVE POTENTIAL OF VINE VARIETIES FOR WHITE WINES RECENTLY ADDED TO THE AMPELOGRAPHIC COLLECTION ON THE SANDY SOILS OF SOUTHERN OLTENIA

Rățoi Iulian[1*], Băjenaru Maria Florentina[1], Paraschiv Alina Nicoleta[1]
[1-]Research – Development Center for Plant on Sands Dabuleni, Victoria Street, Dabuleni.
[*]*Correspondence author: e-mail* iulianratoi@yahoo.com

Keywords*: vine, negative temperature, abundant rainfall*

ABSTRACT

Some of the varieties and clones of vines newly introduced in the ampelographic collection of SCDCPN Dăbuleni have shown potential in terms of quality and quality of grape production. The fertility of the shoots, recorded different values depending on the variety and climatic conditions. The relative fertility coefficient registered, depending on the year, both subunit and supraunitary values, with one exception, the Fetească regală Cl. 21 Bl., In which the values were only superunitary (1,13-1,44) and the maximum value of the absolute fertility coefficient was registered for the Blasius variety, between 1,23 and 2,10.

From the point of view of the production of medium grapes, for the period 2013 - 2020, the Brumăriu varieties stood out, with a production of 18842 Kg / ha and Selena with 17043 Kg / ha. The varieties Blasius (15528 Kg / ha), Fetească regală Cl. 21 Bl. (15243 Kg / ha) and Fetească albă Cl. 1 Od. (13905 Kg / ha). At the opposite pole were the varieties Columna (9468 Kg / ha) and Donaris (8710 Kg / ha).

INTRODUCTION

Improving the wine assortment with varieties that have superior quantitative and qualitative properties, those of the traditional assortment, to adapt to the sandy soil area in southern Oltenia in the current conditions, where there are changes or climatic disturbances, is a constant desideratum of viticulturists (Anca Onache et al. 2008).

On the sandy soils from the south of Oltenia, in a first stage, it went from the traditional assortment, consisting of Roșioară, Berbecel și Parmac to Riesling italian and Rkațiteli (Vlădoianu Em. 1984; Rățoi I. et al. 2002).

The introduction into culture of new varieties and clones, must possess, in addition to quality indices, and characteristics of adaptability to local conditions and especially to climate factors in continuous and permanent change (Liliana Rotaru 2005; Popa Camelia et al. 2009).

The sandy soils from the south of Oltenia are favorable for the cultivation of vine varieties with white and pink grapes for wine, provided the adoption of agrotechnical measures to satisfy the physiological-biochemical requirements of the respective varieties (Olteanu I. et al. 2001; Olteanu I . et al. 2002).

MATERIAL AND METHOD

The experiment was set up in 2010. The planting density was 3787 vines/hectare, a density that resulted from planting distances of 2,2 / 1,2 m.

The following varieties were planted: *Columna, Donaris, Fetească albă 1 Od., Fetească regală 21 Bl, Riesling italian, Alb aromat, Brumăriu, Blasius, Selena.* To compare the results we used the *Riesling italian* variety, a variety that has adapted well to the sandy soils of the south of the country.

The study consisted of observations and experimental determinations regarding the phenology of the vines, the fertility of the shoots, the production of grapes and its quality (weight of 100 berries, total sugar content and total titrable acidity).

To present the results, from the eight years of study, we chose four, namely:

- 2013, because this year, optimal natural conditions were registered for the vine culture;
- 2014, because it was an excessive rain year, in witch the area of sandy soils from southern Oltenia, 994 mm annually and 640,7 mm during the vegetation period;
- the 2019 and 2020, because they were similar in terms of conditions, and in both years there was no phenomenon of crying on the vine.

RESULTS AND DISCUSSIONS

In the period 2012 - 2020, relatively favorable conditions for the cultivation of vines were manifested (Table 1). From the point of view of the minimum temperatures harmful to the vines, in four years out of the eight analyzed, the recorded temperature values caused bud losses. In two of the eight years, the heat phenomenon manifested itself, the temperatures exceeding the value of 40^0C.

Table 1

The main climatic data from 2012 – 2020

Year	Temperature (^{0}C)		Precipitations (mm)			Snow layer thickness (cm)
	Minimum	Maximum	Annual	April – September period	Multiannual	
2012	-24,3	42,6	383,5	230,8	542,9	25
2013	-18,1	38,4	451,5	307,8	541,4	15
2014	-14,1	37,6	994,0	640,7	554,9	25
2015	-25,1	39,2	735,4	398,0	558,6	30
2016	-23,4	38,0	718,5	297,4	561,2	30
2017	-23,4	41,2	742,0	326,6	560,2	40
2018	-17,6	35,7	923,9	510,1	565,9	25
2019	-14,9	38,4	530,8	122,7	565,3	30
2020	-9,4	37,3	583,2	310,4	565,5	15

During this period, precipitation recorded values both below and above the multiannual average, which is around 550 mm. Higher precipitation values were recorded in 2014 (994 mm), and 2018 (923,9 mm), and precipitation values well below the multiannual limit were recorded in 2012 (383,5 mm). During the vegetation period (April - September), from 2014, the recorded precipitations amounted to the largest

amount, 640.7 mm, compared to the multiannual monthly amount from the vegetation period 1956 - 2014, of 311,4 mm, precipitations distributed over a large number of days, namely 74, precipitation that created favorable conditions for the occurrence of the main diseases in vines, *Plasmopara viticola, Uncinula necator or Botrytis cinerea*.

The unfavorable effect of precipitation is all the more harmful when this phenomenon coincides with the critical phase in the vine for diseases, which is located before and after the flowering phenophase.

The snow, in addition to helping to restore soil moisture, protects the vines from the base of the stem, in years with minimum temperatures below their resistance limit, especially the greater the thickness of the layer. In the present situation in the years with minimum harmful temperatures the thickness of the snow layer was 30 - 40 cm.

The budding of the studied varieties took place throughout April, between calendar dates 4 and 30, depending on climatic conditions, and especially temperature (Table 2).

The leek process took place towards the end of July - beginning of August and the ripening of the grapes in the first and second decade of September. Both the ripening and the ripening of the grapes took place relatively simultaneously, in all varieties, with differences from one to five days, depending on the variety.

Table 2

The main phenological observations in some vine varieties with red grapes for white wines in the period 2012 – 2020

Variety	Entry into vegetation	Beginning of the ripening	Grapes maturation
Riesling italian	06-26.04	27-30.07	6-17.09
Columna	04-30.04	24.07-01.08	5-17.09
Donaris	04-30.04	25.07-01.08	5-17.09
Fetească albă Cl. 1 Od.	05-28.04	20.07-01.08	5-17.09
Fetească regală Cl. 21 Bl.	07-28.04	22.07-04.08	6-19.09
Alb aromat	06-24.04	19.07-29.08	1-17.09
Brumăriu	0525.04	18.07-4.08	8-21.09
Blasius	04-28.04	22-31.07	5-18.09
Selena	06-23.04	25.07-3.08	6-21.09

The fertility of the shoots recorded different values depending on the variety and climatic conditions (Table 3).

The relative fertility coefficient registered, depending on the year, both subunit and supraunitary values, with one exception, the *Fetească regală Cl. 21 Bl.*, in which the values were only supraunitary (1,13 – 1,44). The maximum value of the absolute fertility coefficient was recorded for the *Blasius* variety, between 1,23 and 2,10.

Table 3

Fertility of shoots in grape varieties with grapes for white wines in the period 2012 – 2020

Variety	Fertility coefficient	
	relative	absolute
Riesling italian	0,94-1,16	1,36-1,47
Columna	0,83-1,15	1,33-1,80
Donaris	0,85-1,24	1,31-1,44
Fetească albă Cl. 1 Od.	0,83-1,28	1,25-1,31
Fetească regală Cl. 21 Bl.	1,13-1,44	1,62-1,67
Alb aromat	0,64-1,24	1,27-1,50
Brumăriu	0,90-1,25	1,54-1,78
Blasius	0,97-1,41	1,23-2,10
Selena	0,96-1,36	1,44-1,67

In 2012, although the vines were in the third year after planting, all varieties produced a certain amount of grapes, depending on the genetic potential of each variety (Table 4). In some varieties the grape production exceeded 1 Kg / vine, the varieties *Blasius* (4544 Kg / ha), *Alb aromat* and *Brumăriu* (4166 Kg / ha) were noted.

Table 4

Grape production (Kg/ha) for some grape varieties with grapes for white wines in the period 2012 – 2020

Variety	Years					Production limits during the period 2013-2020	Average
	2012	2013	2014	2019	2020		
Riesling italian	757	16667	7574	14749	14769	7574-16667	13439
Columna	757	7954	7195	11740	10982	757-11740	9468
Donaris	757	10227	3030	10603	10982	757-10982	8710
Fetească albă Cl. 1 Od.	3029	21212	7903	14769	11739	7903-21212	13905
Fetească regală Cl. 21 Bl.	378	21212	10224	15148	14390	10224-15148	15243
Alb aromat	4166	29167	8331	2272	7195	2272-29167	11741
Brumăriu	4166	34849	10603	15526	14390	10603-34849	18842
Blasius	4544	29925	8710	14390	9089	8710-29925	15528
Selena	757	35986	6438	14011	11740	6438-35986	17043

Since the first fruiting year, 2013, the production of grapes has been very different, both from one variety to another and from one year to another, depending on climatic conditions and the ability of the variety to counteract the adverse effects of these conditions, 2013 was a favorable year, almost optimal, for the cultivation of vines on the sandy soils in southern Oltenia.

This year most varieties recorded the maximum grape production in this period (2012 - 2020). The *Selena* variety achieved the highest production, of 35986 Kg / ha, followed at a short distance by the *Brumăriu* variety (34849 Kg / ha).

From the point of view of the production of medium grapes, for the period 2013 - 2020, the *Brumăriu* varieties were highlighted, with a production value of

18842 Kg / ha and *Selena* with 17043 Kg / ha. The varieties *Blasius* (15528 Kg / ha), *Fetească regală Cl. 21 Bl. and Fetească albă Cl. 1 Od.* (13905 Kg / ha). All these varieties exceeded the production of grapes made by the control variety, *Riesling italian* (13439 Kg / ha). At the opposite pole were the varieties *Columna* (9468 Kg / ha) and *Donaris* (8710 Kg / ha).

The quality of grape production was assessed by determining the weight of 100 grapes, the total sugar content at harvest and the total titratable acidity at harvest (Table 5).

The weight of 100 grains recorded different values from one variety to another but also depending on the year of study. The highest average weight of 100 grapes was recorded in the varieties *Blasius* (288 g) and *Alb aromat* (282 g).

Table 5

Quality of grapes for some grape varieties with red grapes for white wines in the period 2013 - 2020

Variety	Weight of 100 grains (g)	Total sugar content		Total acidity titrable (g/l) H_2SO_4
		g/l	Kg/ha	
Riesling italian	166	208	1957	4,2
Columna	155	166	1100	3,8
Donaris	178	166	1012	3,9
Fetească albă Cl. 1 Od.	181	188	1830	3,4
Fetească regală Cl. 21 Bl.	172	177	1889	3,8
Alb aromat	282	188	1545	3,0
Brumăriu	217	179	2361	4,1
Blasius	288	172	1869	4,8
Selena	218	222	2648	4,2

The total sugar content of grapes is a variety, but also depends on climatic conditions, the production of grapes on a stump, the degree of disease attack and the time of harvest. The values of this indicator, at harvest maturity, ranged from one variety to another but also from one year to another. From this point of view, the *Selena* variety was on the first place, with an average total amount of sugars of 222 g / l. An average total sugar content, with the lowest value, were made by the *Columna* and *Donaris* varieties (166 g / l).

The Selena variety was also imposed in terms of the total sugar content of grapes, per unit area, with a value of 2648 Kg / ha sugar, both due to the sugar content of the grapes and the production of grapes achieved per unit surface.

Regarding the total titratable acidity, expressed in g / l H_2SO_4, the varieties accumulated very different quantities from one variety to another, with values from 3, to the white aromatic variety, to 4,8 as recorded by the *Blasius* variety

CONCLUSIONS

During the analyzed period, the minimum temperatures harmful to the vines did not cause bud losses in four years. In two of the eight years, the heat phenomenon manifested itself, the temperatures exceeding the value of 40 ^{0}C.

The budding of the studied varieties took place throughout April, the harvesting process took place towards the end of July - beginning of August and the ripening of the grapes in the first and second decade of september.

The fertility of the shoots, recorded different values depending on the variety and climatic conditions. The relative fertility coefficient registered, depending on the year, both subunit and supraunitary values, with one exception, the *Fetească regală Cl. 21 Bl.*, in which the values were only superunitary (1,13 – 1,44) and the maximum value of the absolute fertility coefficient was registered for the *Blasius* variety, between 1,23 and 2,10.

From the point of view of the production of medium grapes, for the period 2013 - 2020, the *Brumăriu* varieties were highlighted, with a production value of 18842 Kg / ha and *Selena* with 17043 Kg / ha. The varieties *Blasius* (15528 Kg / ha), *Fetească regală Cl. 21 Bl.* (15243 Kg / ha) and *Fetească albă Cl. 1 Od*. (13905 Kg / ha). At the opposite pole were the varieties *Columna* (9468 Kg / ha) and *Donaris* (8710 Kg / ha).

The values of the total sugar content, at the harvest maturity, ranged from one variety to another but also from one year to another. From this point of view, the *Selena* variety was on the first place, with an average total amount of sugars of 222 g/l. An average total sugar content, with the lowest value, were made by the *Columna* and *Donaris* varieties (166 g / l).

REFERENCES

Olteanu I., Cichi Daniela, Mărăcineanu L.C., Costea D.C. Gavrilescu Elena, 2001. Dezvoltarea unei viticulturi durabile în Oltenia printr-un management care asigură calitatea produselor viti-vinicole. Analele Universității din Craiova, Facultatea de Horticultură, vol. VI (XLII), pag. 80-83.

Olteanu I., Costea D.C. Gavrilescu Elena, Giugea N., Mărăcineanu L.C., Cichi Daniela, 2002. Contribuția cadrelor didactice de la catedra de viticultură la dezvoltarea unei viticulturi moderne. Analele Universității din Craiova, Facultatea de Horticultură, vol. VII (XLIII), pag. 198-205.

Onache Anca, Rădulescu I., Camelia Popa, 2008. Clonal selection recently homologate of tradional romanian varieties (Fetească regală, Fetească albă, Fetească neagră). Analele Universităţii din Craiova, vol. XIII (XLIX), pp. 93-96.

Popa Camelia, Cezarina Necula, Daniela Cichi, Giugea N., 2009. Studies on the behaviour of variety Golden Ștefănești in vineyards Ștefănești and Banu Mărăcine. Analele Universității din Craiova, – Seria Biologie, Horticulturaă, Tehnologia Prelucrării Produselor Agricole, Ingineria Mediului, vol. XIII (XLIX), pag. 45-48.

Rățoi I., Baniță P., Ploae P., Ploae Marieta, Vladu Florentina, Marcu Florentina, 2002. Rezultate ale cercetării viticole pe solurile nisipoase din Podgoria Sadova-Corabia, Analele Universității din Craiova, vol.VII (XLIII). I.S.S.N. 1435-1275.

Rotaru Liliana, 2005. The behaviour of some new varieties of table grapes in Romania, in the ecoclimatical conditions of the nord-est region. Agricultural University – Plovdiv, Bulgaria, Scientific Works, vol. L., Book 6, Jubilee Scientific Conference ,,State of the art and problem of agricultural sciense and education", 19-20 october.

Vlădoianu Em., 1984. Comportarea unor soiuri de viţă de vie din sortimentul tradiţional pe solurile nisipoase. Lucrări ştiinţifice ale SCCCPN Dăbuleni, vol. VII.