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AGROBIOLOGICAL AND TECHNOLOGICAL VALUE OF SOME ANCESTRAL ROMANIAN VARIETIES IN THE CONDITIONS OF THE ODOBEȘTI VINEYARD

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ABSTRACT

In the context of global warming and the conservation of biodiversity in wine-growing areas, one of the main directions of scientific research is the return to ancestral varieties from the old assortment specific to Romanian vineyards. This paper presents a study on the agrobiological and technological value of four old indigenous grape varieties (Vitis vinifera L.) for white wines ('Galbenă de Odobești', 'Cruciuliță', 'Pîrciu' and 'Gordin'), under the conditions of climate change in the Odobești vineyard, Vrancea county. These varieties demonstrated high fertility potential (71.9 - 92.8 % fertile shoots) and valuable technological characteristics, with a production that varied between 3.50 kg/vine for the 'Pârciu' variety and 5.79 kg/vine for the 'Gordin' variety, under conditions of good accumulation of sugars in the berries (176 - 214 g/L) and a balanced total acidity (>5.3 g/L tartaric acid).

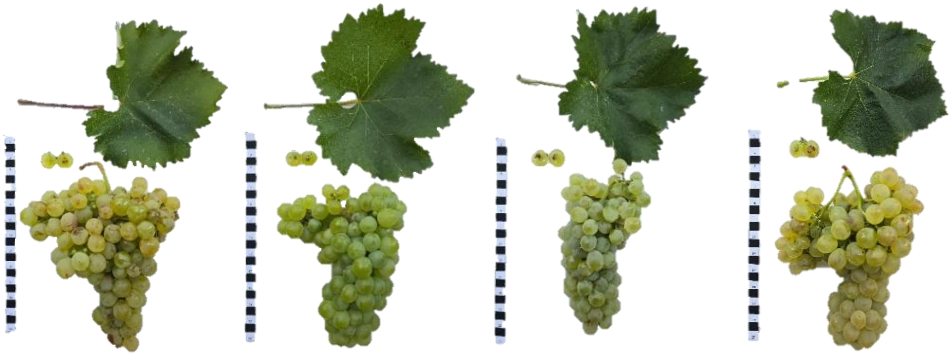
INTRODUCTION

The practice of intensive viticulture in recent decades has considerably affected the biodiversity of the vine, causing the loss of local varieties and intravarietal variability, a phenomenon known as genetic erosion (OIV-VITI Resolution 677-2022). These old varieties are emblematic of each wine-growing area and are an integral part of the history of the vine and the culture of the respective areas (Dhananjay et al., 2021). The neglect or gradual abandonment of these historical grape varieties and the emphasis on so-called “international” grape varieties was mainly due to the susceptibility to diseases and low yields presented by the native varieties. In the context of global warming, in recent years a global effort has been made to rehabilitate forgotten grape varieties, threatened with extinction, due to the dominance of major international grape varieties that represent only a small part of vine biodiversity (Mannini, 2004; Volynkin et al., 2019). Therefore, for the varieties from the old assortments of Romanian vineyards, which gave the note of originality specific to each vineyard, disappeared from the local wine assortment or are less cultivated today ("Cruciuliță", "Pîrciu", "Gordin", "Braghină", "Negru vârtos", "Plăvaie", "Mustoasă", "Berbecel", "Razachie" etc.), laborious work is necessary that requires both identification and conservation, but also reevaluation in current ecoclimatic conditions. Researching the behavior of Romanian ancestral varieties in the face of climate change is one of the current themes of viticultural research in our country (Rotaru et al., 2018, Filimon et al., 2024, Bucur et al., 2025, Băjenaru et al., 2025).

MATERIAL AND METHODS

The research was carried out within the Ampelographic Collection of the Research and Development Station for Viticulture and Oenology (RDSVO) Odobești, with geographical coordinates 45º45′ north latitude, 27º06′ east longitude and an altitude of 150 m. The study was carried out during 2024-2025.

The biological material was represented by four old Romanian grapevine varieties, which were part of the old assortment of the Odobești vineyard, Vrancea county: “Galbenă de Odobești”, “Cruciuliță”, “Pârciu” and “Gordin” (Figure 1). Each genotype was represented in this study by three repetitions with five vines each. The studied varieties were grafted onto the Kobber 5 BB rootstock. The pruning system practiced was Dr. Guyot, with a fruit load of between 30-36 buds/vine, distributed on rows of 8 - 9 buds and fruiting cones with 2-3 buds, and a semi-tall leadership form.



a) b) c) d)

Figure 1. The ancestral vine varieties studied: a) ′Galbenă de Odobești′; b) ′Cruciuliță′; c) ′Pârciu′; d) ′Gordin′

To evaluate the agrobiological and technological potential of the varieties, observations and determinations were made regarding : the phenological spectrum, the fertility (percentage of fertile shoots - FS%, fertility coefficients), productivity indices, yield (kg/vine, t/ha), quality of grapes (g/L sugars, g/L tartaric acid) and physicochemical composition of the wines obtained. The results were statistically interpreted using the Student test (TTEST) in the Microsoft Excel program, for variance analysis, using the average of the four varieties as a control.

RESULTS AND DISCUSSIONS

The main climatic conditions during the grapevine growing season in the Odobești vineyard ecosystem during the study period (2024-2025) are presented in Table 1. According to the recorded data, the two vintages were different from a climatic point of view, namely, the vintage 2024 was one of the warmest and driest years recorded in the Odobești wine area, and the year 2025 was closer to normal climatic values for the Odobești vineyard.

Table 1

The main climatic conditions during the grapevine growing season (2024-2025)

Month	Average temperatures(ºC)			Sum of temperatures useful -Σºtu (ºC)			Rainfall sum (mm)		
	multi-annual	2024	2025	multi-annual	2024	2025	multi-annual	2024	2025
April	11.1	15.5	11.1	69.4	172.7	84.2	48.4	33.9	2.7
May	16.8	16.6	14.3	217.6	205.1	136.9	72.5	28.8	192.3
June	20.2	24.2	22.3	313.7	425.3	368.5	85.9	50.4	26.5
July	22.2	26.8	24.9	377.1	520.0	460.7	76.8	51.8	66.3
Aug.	21.7	25.4	23.6	362.8	477.8	422.9	58.9	24.0	16.8
Sept.	17.1	19.6	18.6	213.6	288.8	258.5	45.0	57.3	101.1
Average /amount	18.2	21.4	19.1	1554.2	2089.7	1731.7	387.5	246.2	405.7

The phenological evolution of the four ancestral indigenous varieties was influenced by the climatic conditions specific to the vintages 2024 and 2025, with an 8 to 15 day earlier evolution of the vegetation phases in 2024, compared to 2025 (Table 2 and Figure 2).

Table 2

The phenological spectrum of the ancestral varieties (Odobeşti, 2024 -2025)

Phenological phases /Variety	Disbudding		Flowering		Grapes veraison		Technological maturity	
	2024	2025	2024	2025	2024	2025	2024	2025
'Galbenă de Odobești'	05.IV	15.IV	24.V	08.VI	30.VII	03.VIII	26.VIII	16.IX
'Cruciuliță'	02.IV	14.IV	25.V	08.VI	31.VII	07.VIII	25.VIII	20.IX
'Pârciu'	05.IV	15.IV	27.V	09.VI	01.VIII	08.VIII	21.VIII	16.IX
'Gordin'	06.IV	15.IV	26.V	07.VI	03.VIII	09.VIII	26.VIII	23.IX



Figure 2. Phenological evolution of 'Pârciu' variety

Under the conditions of the Odobești vineyard, the ancestral grapevine varieties studied exhibited high fertility and productivity characteristics (Table 3).

Table 3

The fertility and productivity characteristics (average values 2024-2025)

Ancestral grape variety	Fertile Shoots (%)	Fertility coefficients		Weight of bunch (g)	Productivity indices	
		Rfc	Afc		Rpi	Api
'Galbenă de Odobești'	87.9	1.19	1.36	239.7	285.2	326.0
'Cruciuliță'	92.8	1.58	1.72	212.3	335.4	365.2
'Pârciu'	71.9	0.94	1.32	224.6	211.1	296.5
'Gordin'	91.2	1.26	1.49	266.8	236.2	397.5

Thus, the fertile shoot coefficient (FS%) had average values close to those recorded in the specialized literature (between 71.9 % for 'Pârciu' variety and 92.8 % for 'Cruciuliță' variety). The absolute fertility coefficient (Afc) recorded average values between 1.32 for 'Pârciu' variety and 1.72 for 'Cruciuliță' variety, and the absolute productivity index (Api) had average values between 296.5 for 'Pârciu' variety and 397.5 for 'Gordin' variety.

The results obtained regarding the technological potential of the four old Romanian varieties in the vintages 2024 and 2025 revealed that the level of climatic factors existing in the ecosystem, as well as the genetic factor, influenced the values of the elements that define the quantity and quality of grape production (Table 4).

Table 4

The quantity and quality of grape production (average values 2024-2025)

Ancestral grape variety	No. grapes/ vine	Yield		Sugar content (g/L)	Total acidity (g/L tartaric acid)	Gluco-acidometric index
		kg/vine	t/ha			
'Galbenă de Odobești'	17.5	4.03	15.26	201	5.35	37.6
'Cruciuliță'	22.2	4.64	17.57	182	6.51	28.0
'Pârciu'	15.2	3.50	13.26	214	5.48	39.1
'Gordin'	21.8	5.79	21.93	176	6.17	28.5

Determined by the average number of grapes per vine, which ranged from 15.2 for the Pârciu variety to 22.2 for the Cruciuliță variety, the average weight of grapes over the two years of study varied between 266.8 g for the Gordin variety and 212.3 g for the Cruciuliță variety, with intermediate values for the Pârciu (224.6 g) and Galbenă de Odobești (239.7 g) varieties.

In the dry conditions of the 2024 wine year, the average grape weight was recorded at 25 % (Cruciuliță variety) to 47 % (Gordin variety) lower values compared to the values recorded in the 2025 wine year, which also led to lower grape production/vine (Figure 3).

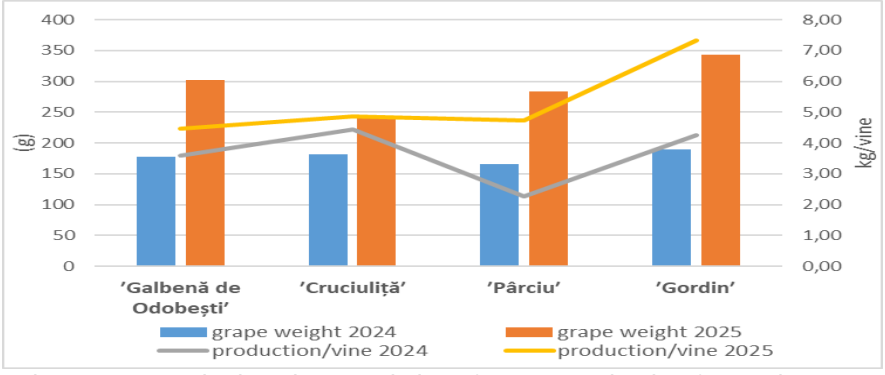


Figure 3. Quantitative characteristics of grape production for study years

Regarding the qualitative potential of grape production, higher sugar accumulations in berries were recorded by 5 % (Pârciu variety) to 20 % (Cruciuliță variety) in the dry conditions of the 2024 wine year. In correlation with the sugar content,

the acidity of the must recorded lower values by 24% (Cruciuliță) to 39 % (Pârciu), compared to the 2025 wine year. It is worth noting that the Galbena de Odobești variety kept its must acidity constant in very different climatic conditions (Figure 4).

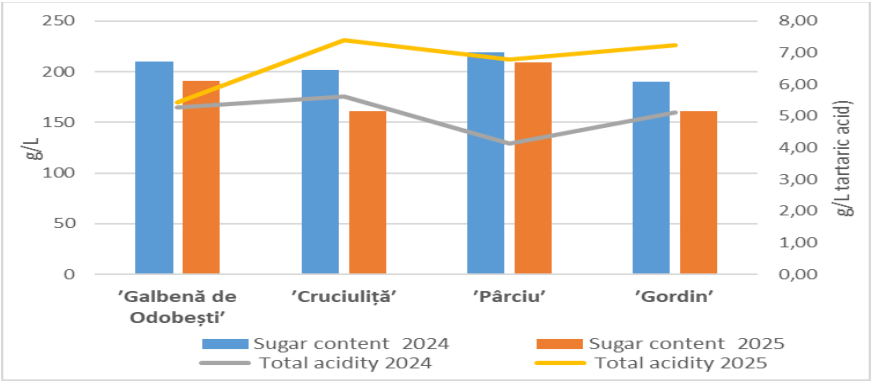


Figure 4. Qualitative characteristics of grape production for study years

The statistical interpretation of the experimental data obtained for the production of grapes/vines in the studied grape varieties compared to the average value - control through the P probability values obtained, shows that the varieties Galbenă de Odobești (0.00715), 'Pârciu' (P=0.00039) and 'Gordin' (P=0.00113) present statistical differences compared to the control variant - average (Table 5).

Table 5

Student's t-test probability value (P) for statistical difference from control

Ancestral grape variety	Student's t-test probability value (P) P critical <0.05		
	Grape production (kg/vine)	Sugar content of the juice (g/L)	Total acidity (g/L tartaric acid)
'Galbenă de Odobești'	0.007151*	0.093412	0.001320*
'Cruciuliță'	0.279219	0.032216*	0.000225*
'Pârciu'	0.000394*	0.005260*	0.000938*
'Gordin'	0.001136*	0.005362*	0.000319*

Also, the P probability values obtained for the sugar content show that the varieties Cruciuliță' (P=0.03221), 'Pârciu' (P=0.00526) and Gordin' (P=0.00536) present statistical differences compared to the control variant - average. Regarding the total acidity of the must, all the studied varieties presented significant differences compared to the control variants - average. The composition profile of the wines - 2024 harvest is presented in table 6.

Table 5

Compositional profile of wines - general compositional analyses - 2024 vintage

Ancestral grape variety	Free SO_2 (mg/L)	Alcohol conc. (% vol.)	Total acidity (g/L tartaric acid)	Volatile acidity (g/L acetic acid)	Sugars (g/L)	Total dry extract (g/L)	Nonreducing extract (g/L)
'Galbenă de Odobești'	10.04	12.8	5.38	0.29	2.33	24.2	21.87
'Cruciuliță'	29.62	12.2	7.23	0.31	2.16	27.4	25.24
'Pârciu'	23.69	13.4	5.46	0.27	1.79	31.0	29.21
'Gordin'	46.36	11.2	5.32	0.35	0.78	23.5	22.72

The wines obtained from the vintage 2024 presented a medium to high alcoholic potential (11.2 - 13.4 %vol. alc), with a good total acidity (5.32 - 7.23 g/L tartaric acid). They were dry wines (0.78 - 2.33 g/L sugar) with medium to high total extractivity (23.5 - 31.0 g/L).

CONCLUSIONS

Under the conditions of the two years of study, the romanian ancestral varieties studied presented the valuable agrobiological and technological characteristics, demonstrating a superior productive and qualitative potential.

The wines obtained from these varieties presented a medium to high alcoholic potential, a good total acidity, are dry wines with a medium to high total extractivity specific to the terroir of the Odobești vineyard.

The results obtained confirm the technological value of these ancestral varieties in the context of regional climate changes, and recommend their reintroduction into the local assortment for the production of quality white wines in the Odobești vineyard, especially the 'Galbenă de Odobești' and 'Pârciu' varieties.

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