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AGROBIOLOGICAL AND TECHNOLOGICAL CHARACTERIZATION OF TRADITIONAL ROMANIAN GRAPEVINE CULTIVARS PRESERVED AT I.N.C.D.B.H. ȘTEFĂNEȘTI, ARGEȘ, UNDER THE GROWING CONDITIONS OF 2026

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ABSTRACT

The study aimed to characterize the agrobiological and technological traits of five traditional Romanian grapevine cultivars Ardeleanca, Coada oilor, Galbenă uriașă, Gordan, and Coarnă neagră preserved in the germplasm collection of I.N.C.D.B.H. Ștefănești, Argeș, Romania. The research conducted in 2026 focused on fertility and productivity indicators, grape bunch biometric characteristics, and the physicochemical parameters of grape must. Statistical analysis revealed significant differences among cultivars for several of the characteristics studied (Duncan's multiple range test, p ≤ 0,05). The cultivar Galbenă uriașă exhibited the highest number of fertile shoots (15 shoots per vine), an absolute fertility coefficient of 1,47, and the highest relative productivity index (453,18). In contrast, Coarnă neagră cultivar recorded the highest mean weight (431,07 g), weight of 100 berries (393,81 g), and an absolute productivity index (549,39). The results highlight the potential of these autochthonous genetic resources to improve fertility and the biometric characteristics of grape clusters through breeding.

INTRODUCTION

The conservation and characterization of grapevine genetic resources are important components of maintaining viticultural diversity and identifying traits of agronomic, technological, and adaptive value. The genetic diversity within the genus *Vitis*, including that preserved in germplasm collections, may represent a valuable source of biological material for selection and breeding, with the aim of developing or identifying genotypes adapted to changing cultivation conditions (Magon et al. 2023).

In the context of climate change, assessing varietal diversity and identifying plant material capable of responding to various environmental constraints have become important objectives for viticulture.

The International Organisation of Vine and Wine highlights differences among grapevine cultivars in their tolerance and capacity to adapt to climatic factors and recommends the conservation of genetic resources, the evaluation of existing

germplasm, and the characterization of traditional cultivars to identify biological material adapted to new environmental conditions (OIV, 2021).

The viticultural heritage conserved in Romania includes numerous traditional grapevine cultivars, some of which are characterized by a limited geographical distribution or very limited cultivation areas. Studies on Romanian grapevine genetic resources have highlighted the diversity of the conserved biological material and the importance of its accurate identification and characterization, including through the use of ampelographic descriptors and molecular markers, thereby contributing to the clarification of varietal synonymies and identities (Popescu et al. 2017).

However, the evaluation of conserved genetic resources should not be limited to varietal identification but should also include the agrobiological and technological characterization of cultivars to assess their value and potential for utilization. Recent research conducted on old Romanian grapevine cultivars has used parameters such as fertility, yield, sugar accumulation, and total must acidity to evaluate their performance under the climatic conditions specific to the study year, highlighting the usefulness of an integrated approach to characterizing old grapevine cultivars (Pușcalău et al. 2025).

In this context, the study conducted in 2026 at I.N.C.D.B.H. Ștefănești aimed to comparatively characterize the grapevine cultivars Ardeleanca, Coada oilor, Galbenă uriașă, Gordan, and Coarnă neagră.

The research involved the determination of fertility and productivity indicators, as well as technological and quality parameters for the grapes of the five analyzed cultivars, with the aim of expanding the available information regarding the evaluation, utilization potential, and possible use of these genetic resources in grapevine breeding.

MATERIALS AND METHODS

The research was conducted in 2026 at I.N.C.D.B.H. Ștefănești on five old grapevine cultivars preserved in the germplasm collection: Ardeleanca, Coada oilor, Galbenă uriașă, Gordan, and Coarnă neagră. All cultivars were grown under the same cultivation conditions. The study was carried out within the framework of the ADER 6.3.12 project.

Evaluation of the Agrobiological Characteristics of Grapevine Cultivars

Determination of Fertility Characteristics

For each cultivar, 10 vines were examined, and the total number of shoots, the number of fertile shoots, and the number of inflorescences were recorded. Based on these measurements, the percentage of fertile shoots (LF), the relative fertility coefficient (CFR), and the absolute fertility coefficient (CFA) were calculated according to the methodology for the agrobiological characterization of grapevine cultivars (Irimia 2012):

LF (%) = (Number of fertile shoots / Total number of shoots) × 100

CFR = Number of inflorescences / Total number of shoots (fertile + sterile)

CFA = Number of inflorescences / Number of fertile shoots

Determination of Productivity Characteristics and Yield

Fertility, expressed by the absolute and relative fertility coefficients, does not fully reflect the yield characteristics of grapevine cultivars in relation to the climatic factors of the ecosystem. Therefore, the mean bunch weight must also be considered when assessing cultivar productivity, as productivity represents the

capacity of the grapevine to produce and develop grape clusters until full maturity (Bosoi, 2023).

Productivity was assessed using the relative productivity index (IPR) and the absolute productivity index (IPA):

IPR = CFR × g

IPA = CFA × g

where g represents the mean bunch weight at full maturity (Irimia 2012).

Evaluation of the Technological Characteristics of Grapevine Cultivars

Determination of Grape Bunch Physical Characteristics

The technological characteristics of wine grape cultivars are reflected in the physical properties of grape clusters. Observations and measurements were performed in accordance with the OIV descriptors for grapevine cultivars and species of the genus Vitis (OIV 2009).

The mean bunch weight was determined at full maturity, according to descriptors OIV 502 and IBPGR 6.2.25. For this purpose, all grape clusters from 10 shoots originating from 10 different vines of the same cultivar were weighed, and the mean bunch weight was subsequently calculated and expressed in grams (g).

Grape bunch structure was evaluated using all clusters harvested from 10 shoots originating from 10 different vines of the same cultivar. For its characterization, the number and weight of berries, rachis weight, as well as pulp, skin, and seed weights were determined.

Based on these measurements, the grape bunch structure index, expressed as the ratio of berry weight to rachis weight, the berry composition index, calculated as the ratio of pulp weight to the combined weight of skins and seeds, and the berry index, defined as the number of berries per 100 g of grape clusters, were calculated.

The weight of 100 berries was determined at full maturity, according to descriptors OIV 503 and IBPGR 6.2.26. For each cultivar, 10 berries were collected from the middle section of each of 10 grape clusters originating from 10 different vines, resulting in a sample of 100 berries. The berries were weighed, and the result was expressed in grams (g/100 berries).

Determination of the Main Physicochemical Parameters of Grapes

Sugar content was determined using an ATAGO digital refractometer, and the results were expressed in °Brix. The correspondence between the measurement scales used to determine the sugar concentration of the juice extracted from grape berries and the conversion into g/L sucrose was established using the tables presented by Ribéreau-Gayon et al. 2004.

The total acidity of the juice extracted from grape berries was determined using a PAL-Easy ACID2 portable analyzer (ATAGO Co., Ltd., Japan) on samples diluted at a ratio of 1:50, according to the manufacturer's protocol. The values provided by the instrument, expressed as % tartaric acid equivalent, were converted into g/L tartaric acid by applying a conversion factor of 10 (ATAGO Co., Ltd. 2018).

The pH of the juice extracted from grape berries was determined using a LAQUAtwin-pH-22 portable pH meter (HORIBA, Japan), based on the glass electrode method. The instrument was calibrated using standard buffer solutions at pH 4,01 and pH 7,00, and the values were recorded after signal stabilization (HORIBA 2017). The glucose–acidimetric index was calculated as the ratio of sugar content to the total acidity of the juice extracted from grape berries.

Experimental data were statistically processed using IBM SPSS Statistics software, version 26 (IBM Corp., Armonk, NY, USA). Statistical analysis was performed using one-way analysis of variance (ANOVA), with cultivar considered as the experimental factor. To identify statistically significant differences between the experimental treatments represented by the studied cultivars, Duncan's multiple range test was applied at a significance level of *p* < 0,05. The results were expressed as mean ± standard deviation (SD). Values followed by different letters, with no letters in common, indicate statistically significant differences, whereas values sharing at least one letter are not significantly different.

RESULTS AND DISCUSSION

The total number of shoots, the number of fertile shoots, and the number of inflorescences per vine varied among cultivars. The highest values for the total number of shoots were recorded in Galbenă uriașă and Coarnă neagră (18 shoots per vine), with no statistically significant differences between them. Ardeleanca exhibited the lowest number of shoots (15 shoots per vine), with statistically significant differences compared with the two previously mentioned cultivars.

Regarding the number of fertile shoots, Galbenă uriașă recorded the highest value (15 shoots per vine), which was significantly higher than those observed in Gordan, Coada oilor, and Coarnă neagră.

Regarding the number of inflorescences per vine, the highest value was recorded in Galbenă uriașă (22), followed by Ardeleanca (19), Coada oilor and Gordan (16), while the lowest value was observed in Coarnă neagră (14). Statistically significant differences were identified among cultivars, except between Coada oilor and Gordan, which belonged to the same homogeneous group (Figure 1).

Shoot fertility varied among the evaluated cultivars, with the percentage of fertile shoots (LF%) ranging from 61,11 % to 86,67 %. The highest values were recorded in Ardeleanca (86,67 %) and Galbenă uriașă (83,33 %), whereas Coarnă neagră exhibited the lowest percentage of fertile shoots (61,11 %) (Figure 2).

Regarding the number of fertile shoots per vine, Duncan's multiple range test revealed significant differences among the studied cultivars. Galbenă uriașă recorded the highest value (15 fertile shoots per vine), differing significantly from the other cultivars, while Ardeleanca (13 fruitful shoots per vine) occupied an intermediate position. The lowest value was recorded in Coarnă neagră (11 fertile shoots per vine), whereas Coada oilor and Gordan exhibited identical values (12 fertile shoots per vine), with no significant differences between them. The observed variability highlights the influence of genotype on grapevine fertility characteristics. Similar findings regarding genotype-dependent differences in fertility were reported by Ciobotea et al. (2021) in a study of hybrid selections for table grape production grown under the conditions of the Ștefănești viticultural center.

Cultivar influenced the absolute (CFA) and relative (CFR) fertility coefficients, revealing differences in the fruiting potential of the evaluated genotypes. The absolute fertility coefficient ranged from 1,27 to 1,47, with the highest values recorded in Galbenă uriașă (1,47) and Ardeleanca (1,46). Intermediate and identical values were recorded in Coada oilor and Gordan (1,33), whereas Coarnă neagră exhibited the lowest absolute fertility coefficient (1,27).

Regarding the relative fertility coefficient, the influence of cultivar was reflected in a wider range of values, from 0,78 to 1,27. The highest value was recorded in

Ardeleanca (1,27), followed by Galbenă uriașă (1,22) and Gordan (1,00), whereas the Coada oilor (0,94) and Coarnă neagră (0,78) cultivars exhibited lower values.

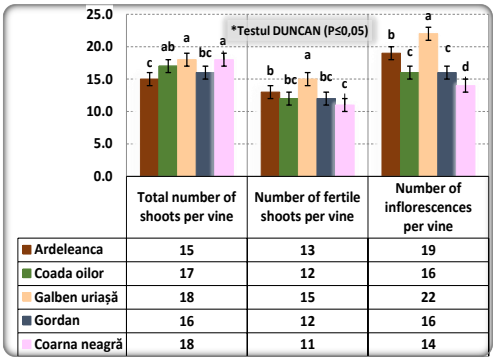


Figure 1. Total number of shoots per vine, total number of fertile shoots per vine, and number of inflorescences per vine (2026)

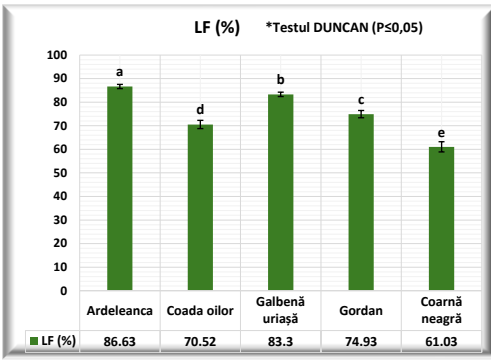


Figure 2. Effect of grapevine cultivar on the fertile shoot coefficient (LF%) (2026)

The differences observed between the two coefficients reflect the genotypic characteristics of the studied cultivars, both in terms of the proportion of fertile shoots and their capacity to produce inflorescences (Figure 3).

Cultivar, as an experimental factor, significantly influenced the absolute (IPA) and relative (IPR) productivity indices, revealing differences in productive potential among the evaluated genotypes. The absolute productivity index ranged from 355,48 to 549,39, with the highest values recorded in Coarnă neagră (549,39) and Galbenă uriașă (543,88), which belonged to the same statistical significance group according to Duncan's multiple range test ($p \leq 0,05$). The Gordan cultivar exhibited an intermediate value (441,14), with no significant differences compared with the other cultivars, whereas Ardeleanca (355,48) and Coada oilor (358,23) recorded the lowest values and were assigned to the same homogeneous group.

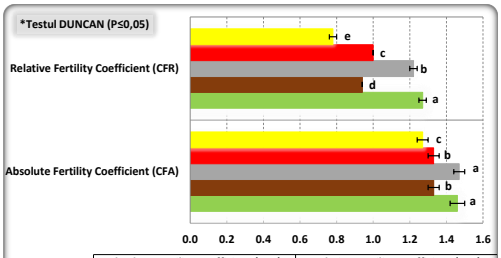
Regarding the relative productivity index, the effect of cultivar was demonstrated by the statistically significant difference between Galbenă uriașă (453,18) and the other evaluated genotypes. The values recorded in Coarnă neagră (335,01), Gordan (329,60), Ardeleanca (308,19), and Coada oilor (252,53) did not present statistically significantly and were assigned to the same homogeneous group.

Of particular interest was the performance of Coarnă neagră, which, despite exhibiting the lowest percentage of fertile shoots (61,11%), recorded the highest absolute productivity index, suggesting the contribution of mean grape bunch weight to the expression of productive potential (Figure 4).

The differences between the productivity indices reflect the genotypic characteristics of the studied cultivars, resulting from the combined effects of shoot fertility and mean grape bunch weight. According to Leonte (1996), grapevine productivity is determined by the interaction of its main components, namely the number of fertile shoots, the number of grape clusters per vine and per shoot, and their weight. Sestraș (2004) highlights the complex genetic nature of productivity components, as well as the influence of environmental conditions and agrotechnical factors on their expression. In the same context, Dumitriu (2008) and Oprea (2001),

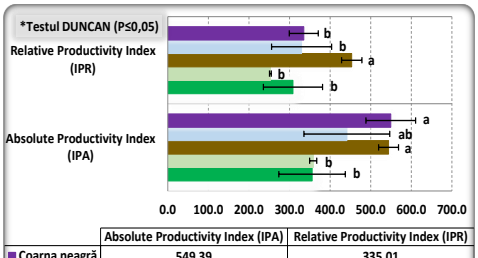
cited by Ciobotea et al. (2021), emphasize the importance of the relative productivity index in assessing the productive capacity of grapevines.

Comparable results regarding the differentiation of productivity indices based on genotype were reported by Ciobotea et al. (2021), who, in their research on hybrid selections for table grape production grown at the Ștefănești viticultural center, identified variations in the absolute productivity index ranging from 136,59 to 631,14 and in the relative productivity index ranging from 25,95 to 249,36. In the present study, Galbenă uriașă was distinguished by high values of both productivity indices, whereas Coarnă neagră exhibited a high absolute productivity index but a relative productivity index significantly lower than that recorded in Galbenă uriașă. These results highlight the importance of simultaneously evaluating both indices to characterize the productive potential of grapevine cultivars.



	Absolute Fertility Coefficient (CFA)	Relative Fertility Coefficient (CFR)
Coarna neagră	1.27	0.78
Gordan	1.33	1.00
Galben uriașă	1.47	1.22
Coada oilor	1.33	0.94
Ardeleanca	1.46	1.27

Figure 3. Effect of grapevine cultivar on the absolute (CFA %) and relative (CFR %) fertility coefficients (2026)



	Absolute Productivity Index (IPA)	Relative Productivity Index (IPR)
Coarna neagră	549.39	335.01
Gordan	441.14	329.60
Galben uriașă	543.88	453.18
Coada oilor	358.23	252.53
Ardeleanca	355.48	308.19

Figure 4. Effect of grapevine cultivar on the absolute (IPA) and relative (IPR) productivity indices (2026)

Mean grape bunch weight ranged from 243,49 to 431,07 g and was significantly influenced by cultivar as an experimental factor. The highest value was recorded in Coarnă neagră (431,07 g), followed by Galbenă uriașă (370,80 g), with no statistically significant differences between these cultivars according to Duncan's multiple range test ($p \leq 0,05$). Gordan exhibited an intermediate value (329,60 g), whereas the lowest values were recorded in Coada oilor (268,35 g) and Ardeleanca (243,49 g), which belonged to the same statistical homogeneous group (Figure 5).

Regarding the mean number of berries per grape bunch, values ranged from 106,67 to 181,00, with no statistically significant differences among the evaluated cultivars. The highest mean number of berries was recorded in Gordan (181,00), followed by Coada oilor (167,67), Galbenă uriașă (146,33), and Ardeleanca (135,00), whereas Coarnă neagră exhibited the lowest value (106,67). The absence of statistically significant differences suggests that the variability observed for this parameter did not allow statistical differentiation among cultivars under the investigated experimental conditions (Figure 6).

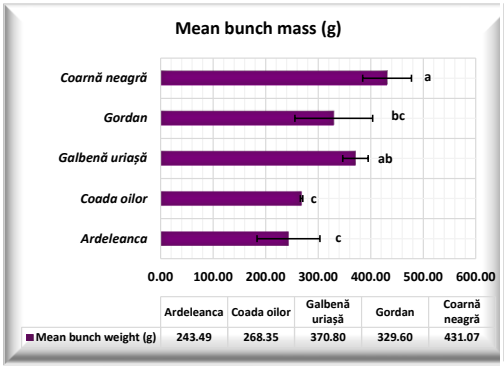


Figure 5. Effect of grapevine cultivar on mean bunch mass (g)

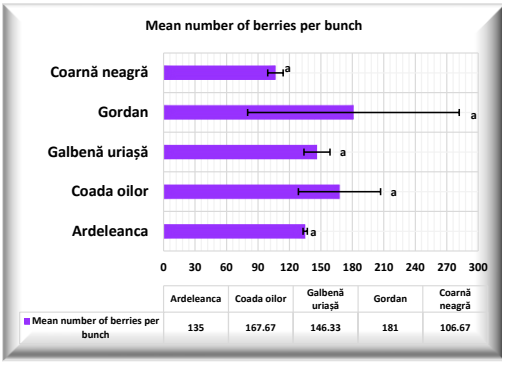


Figure 6. Effect of grapevine cultivar on the mean number of berries per bunch

The mass of 100 berries showed more pronounced differences among cultivars, with values ranging from 160,62 to 393,81 g. Coarnă neagră exhibited the highest value (393,81 g), differing significantly from all other cultivars. The values recorded for Galbenă uriașă (246,20 g), Coada oilor (203,05 g), Gordan (194,94 g), and Ardeleanca (160,62 g) did not differ significantly and were assigned to the same homogeneous group. Notably, although Coarnă neagră exhibited the lowest mean number of berries per bunch, it recorded the highest values for both mean bunch mass and the mass of 100 berries, highlighting the contribution of berry size to bunch mass (Figure 7).

The results obtained confirm the importance of genotypic characteristics in determining the biometric traits of grape bunches. Sestraș (2004), as cited by Ciobotea et al. (2021), highlights the complex genetic determination of productivity components and the influence of environmental conditions and agrotechnical factors on these traits.

In the research conducted by Ciobotea et al. (2021) on hybrid selections for table grape production, mean bunch mass and the mass of 100 berries also differed among genotypes, emphasizing the importance of these characteristics in assessing the productive potential and agrobiological traits of grapevines.

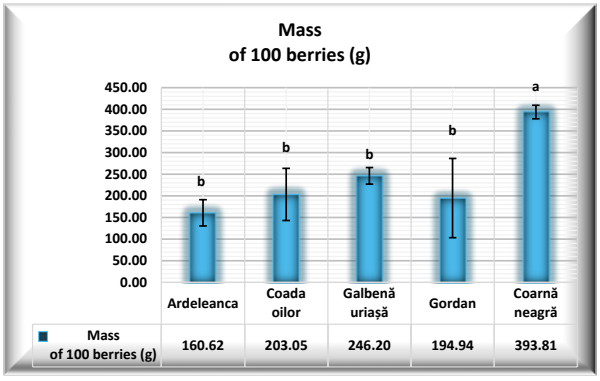


Figure 7. Effect of grapevine cultivar on the mean mass of 100 berries (g)

Cultivar, as an experimental factor, had a statistically significant effect on the mean total berry mass per bunch. The Coarnă neagră cultivar recorded the highest value (420,83 g), which was significantly higher than those recorded for Ardeleanca, Coada oilor, and Gordancultivars, but did not differ significantly from Galbenă uriașă (355,02 g). The lowest values were recorded for Ardeleanca (211,79 g) and Coada oilor (246,02 g) cultivars, with no statistically significant differences between them. The Gordan cultivar (285,42 g) exhibited an intermediate value, with no significant differences compared with Galbenă uriașă, Ardeleanca, and Coada oilor, according to the grouping of means obtained using Duncan's multiple range test ($p \leq 0,05$) (Figure 8)

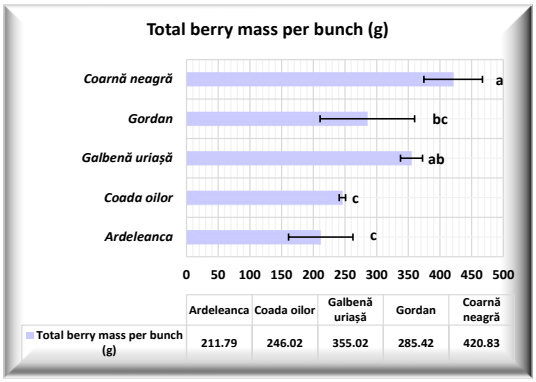


Figure 8. Effect of grapevine cultivar on mean total berry mass per bunch (g)

Cultivar, as an experimental factor, significantly influenced rachis, pulp, and seed mass, whereas skin mass did not differ significantly among the evaluated genotypes. Rachis mass, expressed in grams, ranged from 10,23 to 44,18 g, with the highest value recorded in the Gordan cultivar (44,18 g), which differed significantly from all other cultivars according to Duncan's multiple range test ($p \leq 0,05$). Intermediate values were recorded in Ardeleanca (31,70 g) and Coada oilor (22,34 g), whereas the lowest values were observed in Galbenă uriașă (15,78 g) and Coarnă neagră (10,23 g), with no significant differences between them.

Skin mass ranged from 14,09 to 19,95 g, with no statistically significant differences among the studied cultivars. The highest value was recorded in Coada oilor (19,95 g), followed by Coarnă neagră (17,18 g), Galbenă uriașă (16,57 g), and Ardeleanca (15,71 g), whereas Gordan cultivar exhibited the lowest value (14,09 g).

Seed mass ranged from 6,34 to 15,26 g, with the highest value recorded in Galbenă uriașă cultivar (15,26 g), which differed significantly from all other cultivars. The Coarnă neagră cultivar exhibited an intermediate value (11,20 g), with no significant differences compared with Ardeleanca (9,35 g) and Coada oilor (9,72 g). The lowest value was recorded in the Gordan cultivar (6,34 g), with no significant differences compared with Ardeleanca and Coada oilor (Figure 9).

Regarding pulp mass, significant differences were observed among the evaluated cultivars, with values ranging from 186,73 to 392,45 g. The highest value was recorded in the Coarnă neagră cultivar (392,45 g), followed by Galbenă uriașă (323,18 g), with no statistically significant differences between them. The Gordan cultivar exhibited an intermediate value (264,99 g), whereas the lowest values were recorded in Coada oilor (216,35 g) and Ardeleanca (186,73 g), which belonged to

the same statistical homogeneous group. The high pulp mass values recorded in Coarnă neagră and Galbenă uriașă are consistent with the higher mean bunch mass determined for these cultivars (Figure 10

The observed differences in bunch structure highlight the genotypic characteristics of the studied cultivars, particularly regarding the contribution of pulp mass to total bunch mass. Ciobotea et al. (2021), in their research on hybrid selections for table grape production, also identified differences among genotypes in pulp, skin, and seed mass, emphasizing the importance of these characteristics in assessing the technological traits of grape bunches. According to Sestraș (2004), as cited by Ciobotea et al. (2021), productivity components are under complex genetic control and are influenced by both genotypic characteristics and environmental conditions and agrotechnical factors. In the present study, Coarnă neagră exhibited the highest pulp mass and the lowest rachis mass, whereas Galbenă uriașă showed high values for both pulp and seed mass, highlighting distinct characteristics of bunch structure.

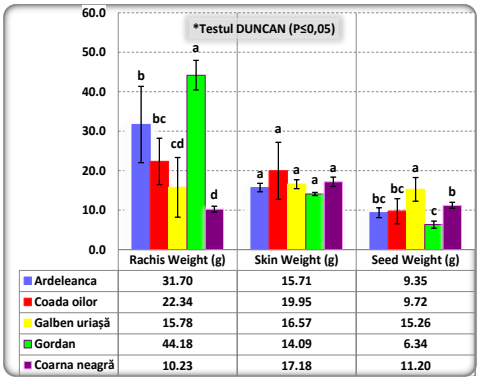


Figure 9. Effect of grapevine cultivar on mean rachis, skin, and seed weight (g) (2026)

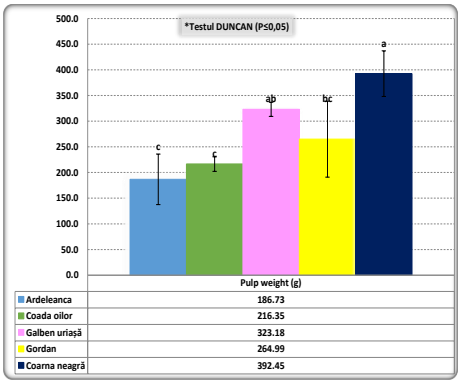


Figure 10. Effect of grapevine cultivar on mean pulp weight (g) (2026)

Cultivar, as an experimental factor, significantly influenced the bunch structure index and berry composition index, revealing differences among the evaluated genotypes. The bunch structure index ranged from 6,51 to 41,23, with the highest value recorded in Coarnă neagră (41,23), which differed significantly from all other cultivars according to Duncan's multiple range test ($p \leq 0,05$). Galbenă uriașă exhibited an intermediate value (26,75), which differed significantly from those of the other genotypes, whereas Ardeleanca (6,83), Coada oilor (11,65), and Gordan (6,51) recorded the lowest values, with no statistically significant differences among them.

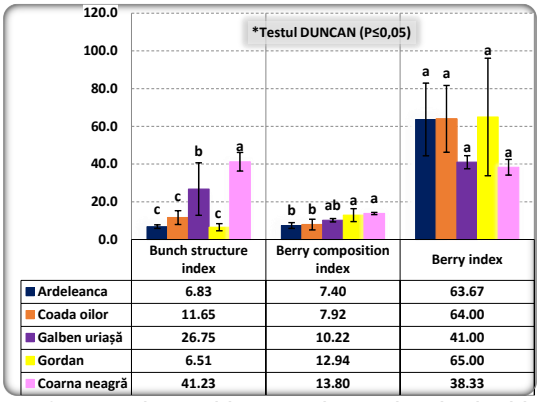
The berry composition index ranged from 7,40 to 13,80, with the highest values recorded in Coarnă neagră (13,80) and Gordan (12,94), which belonged to the same statistical homogeneous group. Galbenă uriașă exhibited an intermediate value (10,22), with no significant differences compared with the other cultivars, whereas the lowest values were recorded in Coada oilor (7,92) and Ardeleanca (7,40), with no statistically significant differences between them.

Regarding the berry index, values ranged from 38,33 to 65,00, with no statistically significant differences among the studied cultivars. The highest values

were recorded in Gordan (65,00), Coada oilor (64,00), and Ardeleanca (63,67), followed by Galbenă uriașă (41,00), whereas Coarnă neagră exhibited the lowest value (38,33). The assignment of all cultivars to the same statistical homogeneous group indicates that the observed numerical differences were not statistically significant (Figure 11).

The results highlight the genotypic characteristics of the evaluated cultivars in terms of bunch structure and berry composition. Coarnă neagră was distinguished by the highest values for both the bunch structure index and the berry composition index, consistent with the high pulp weight and low rachis weight previously determined for this cultivar.

Genotype-dependent differences in the structural and technological characteristics of grape bunches were also reported by Ciobotea et al. (2021) in their research on hybrid selections for table grape production. Furthermore, Sestraș (2004), as cited by Ciobotea et al. (2021), highlights the complex genetic determination of productivity and quality traits, as well as the influence of environmental conditions and agrotechnical factors on their expression.



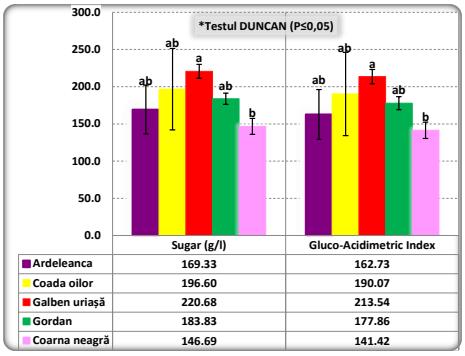
	Bunch structure index	Berry composition index	Berry index
Ardeleanca	6.83	7.40	63.67
Coada oilor	11.65	7.92	64.00
Galben uriașă	26.75	10.22	41.00
Gordan	6.51	12.94	65.00
Coarna neagră	41.23	13.80	38.33

Figure 11. Effect of grapevine cultivar on the technological indices of grape bunches at harvest

Cultivar had a statistically significant effect on sugar content, pH, and the sugar-to-acid ratio of the juice extracted from grape berries, whereas total acidity did not differ significantly among the evaluated cultivars. Galbenă uriașă recorded the highest sugar content (220,68 g/L), which was significantly higher than that recorded in Coarnă neagră (146,69 g/L), while the other cultivars exhibited intermediate values.

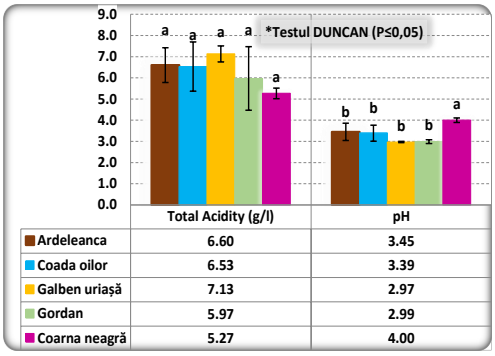
The sugar-to-acid ratio ranged from (141,42) in Coarnă neagră to (213,54) in Galbenă uriașă. These findings highlight distinct cultivar-specific characteristics regarding sugar accumulation and the sugar–acid balance of the juice extracted from grape berries (Figure 12).

Regarding pH, Coarnă neagră recorded the highest value (4,00), which differed significantly from those of all other cultivars (Figure 13).



	Sugar (g/l)	Gluco-Acidimetric Index
Ardeleanca	169.33	162.73
Coada oilor	196.60	190.07
Galben uriaşă	220.68	213.54
Gordan	183.83	177.86
Coarna neagră	146.69	141.42

Figure 12. Influence of cultivar on sugar content (g/L) and the glucose-acidimetric index (2026)



	Total Acidity (g/l)	pH
Ardeleanca	6.60	3.45
Coada oilor	6.53	3.39
Galben uriaşă	7.13	2.97
Gordan	5.97	2.99
Coarna neagră	5.27	4.00

Figure 13. Effect of grapevine cultivar on total acidity and pH (2026)

CONCLUSIONS

The comparative evaluation of the traditional grapevine cultivars ‘Ardeleanca’, ‘Coada oilor’, ‘Galbenă uriașă’, ‘Gordan’, and ‘Coarnă neagră’ revealed significant differences in most of the agrobiological and technological traits assessed.

The highest percentages of fruitful shoots were recorded for ‘Ardeleanca’ (86.67 %) and ‘Galbenă uriașă’ (83.33 %), with the latter exhibiting the highest number of fertile shoots per vine (15), the highest absolute fertility coefficient (1.47), and the highest relative productivity index (453.18). ‘Ardeleanca’ recorded the highest relative fertility coefficient (1.27), while the highest absolute productivity indices were observed for ‘Coarnă neagră’ (549.39) and ‘Galbenă uriașă’ (543.88), with the latter also exhibiting the highest sugar content in the must.

The cultivar ‘Coarnă neagră’ was distinguished by the highest mean bunch weight (431.07 g), 100-berry weight (393.81 g), and pulp weight (392.45 g), as well as the lowest rachis weight (10.23 g) and the highest bunch structure index (41.23) and berry composition index (13.80). ‘Galbenă uriașă’ recorded the highest seed weight (15.26 g). No statistically significant differences among cultivars were observed for the mean number of berries per bunch, skin weight, or berry index.

Overall, ‘Galbenă uriașă’ was characterized by high fertility, productivity, and sugar accumulation, whereas ‘Coarnă neagră’ exhibited favorable biometric and technological characteristics. These findings highlight the distinct potential of the evaluated genotypes and their relevance for the valorization of traditional grapevine cultivars under the specific growing conditions of the Ștefănești viticultural center.

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