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A REVIEW OF THE PRODUCTION AND QUALITY OF SOME AUTOCHTHONOUS GRAPE CULTIVARS CULTIVATED AT S.C.D.C.P.N. DĂBULENI

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ABSTRACT

Native grape cultivars are essential for preserving the cultural identity, biodiversity, and viticultural heritage of a region. The wide range of cultivars worldwide highlights the high genetic variability of grapevines and their remarkable adaptability to diverse ecological conditions. However, interest in traditional Romanian cultivars has gradually declined: some remained under cultivation until the mid-20th century, others survive only in ampelographic collections, and many have been lost. While several countries recognized the limitations of hybrid cultivars early on and chose to preserve native ones through grafting, Romanian viticulture has largely maintained its identity through the production of wines from indigenous and local cultivars. To safeguard this identity, it is vital to prioritize the cultivation of native grape cultivars, including newly developed cultivars, while also integrating foreign cultivars that have adapted well to Romanian pedoclimatic conditions. This paper provides a review of several native grape cultivars that have been historically cultivated at the Research and Development Station for Plant Culture on Sands Dăbuleni.

INTRODUCTION

Viticulture and winemaking have a long-standing tradition in Romania (Teodorescu, 1964). However, the number of native cultivars and the areas cultivated with them have been steadily decreasing (Antoce & Călugăru, 2017; Cichi et al., 2020). This trend poses a real risk of diminishing the national grape germplasm fund, a concern amplified by climate change and the lack of adequate funding for the conservation and sustainable use of local genetic resources (Bucur et al., 2018; Cichi, 2006; Duchene et al., 2010; Cichi et al., 2019; Cichi et al., 2022).

Grapevine cultivars can be broadly divided into local cultivars and improved cultivars (Pop, 2010; Dobrei et al., 2015). Local cultivars emerged through long processes of natural and empirical selection carried out by generations of anonymous growers (Meneghetti et al., 2013). These cultivars, shaped by specific pedoclimatic conditions, are well adapted but generally limited in distribution (Jackson & Lombard, 1993). Several old native cultivars such as 'Tămâioasă

românească', 'Grasă de Cotnari', 'Galbenă de Odobești', and 'Mustoasă de Măderat' have survived to the present day due to their exceptional quality (Dobrei et al., 2008).

Soil and climate remain crucial factors in determining grape quality. Local climatic variability significantly influences wine quality, often necessitating annual adjustments in winemaking practices (Cyril et al., 2014). Native table and mixed-use cultivars typically present an attractive appearance and balanced composition, making them suitable for both fresh consumption and the production of light, pleasant wines (Moș & Dobrei, 2011).

The viticultural conditions of southern Oltenia, particularly its sandy soils, have historically limited the range of cultivars that can thrive. Extreme summer temperatures, surface heating of sands, and atmospheric drought demanded highly resilient vines. Traditional assortments included 'Roșioară', 'Berbecel', and 'Parmac' for white and rosé wines, and 'Negru vîrtos', 'Negru moale', and 'Băbească neagră' for red wines (Dvornic, 1955; Dvornic et al., 1964; Oprean, 1964; Constantinescu et al., 1972). Each cultivar displayed distinct biotypes, yields, and wine qualities, but wines from these soils were generally low in extract, alcohol, and acidity, with limited fruitiness (Alexiu, 1965; Vlădoianu, 1979).Following the phylloxera crisis, several native cultivars — 'Crâmpoșie', 'Fetească albă', 'Tămâioasă românească', 'Fetească neagră', 'Tămâioasă roze' — and European cultivars — 'Cabernet Sauvignon', 'Merlot', 'Pinot noir', 'Riesling Italian', among others — were introduced (Popa et al., 2020). After 1965, the foundations of an ampelographic collection were laid at the Research and Development Station for Plant Culture on Sands (SCDCPN) Dăbuleni, where more than 600 cultivars were studied, and modern planting techniques were tested (Diaconu et al., 2019). By the 1980s, viticulture in the sandy soils of Oltenia had covered over 10,000 ha. However, this area has since declined dramatically, with SCDCPN Dăbuleni now maintaining only 14 ha, alongside approximately 200 ha cultivated by local producers.After 2000, a new ampelographic collection was established at Dăbuleni, including both new Romanian cultivars ('Victoria', 'Prima Cl. 1022', 'Novac', 'Selena') and well-adapted foreign ones. Despite these efforts, the most significant cultivar for sandy soils remains 'Roșioară', which has historically occupied large areas both before and after 1990.

This review synthesizes the historical, horticultural, and qualitative aspects of native grape cultivars cultivated at SCDCPN Dăbuleni, with a focus on their role in preserving Romania's viticultural identity and biodiversity.

PRODUCTION AND QUALITY OF SOME GRAPE CULTIVARS IN THE PERIOD 1969-1990

During this period, a comprehensive evaluation of local grape cultivars was carried out at SCDCPN Dăbuleni. The results include grape production, berry weight, sugar content, and titratable acidity for white, rosé, red, and table grape cultivars. Key differences among cultivars and trends in quality parameters are summarized in Tables 1–3.

Table 1.

Production and quality of some white wine grape cultivars during 1969-1975 (Vlădoianu, 1979)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Roșioară'	23.95	255	148	3.3
'Roșioară verde'	23.60	241	145	3.3
'Roșioară comună'	23.00	253	149	3.2
'Roșioară neagră'	20.80	247	152	3.1
'Parmac'	22.35	302	143	4.3
'Parmac verde'	22.60	305	138	4.0
'Parmac auriu'	21.80	314	140	4.7
'Galbenă Odobești'	17.65	294	159	4.8
'Fetească regală'	16.55	176	175	4.6
'Berbecel'	15.65	213	154	3.9
'Mustoasă Măderat'	20.10	227	163	5.5
'Crîmpoșie'	15.10	306	157	4.2
'Iordană'	13.60	238	175	3.9
'Frîncușe'	9.40	220	184	3.9
'Grasă de Cotnari'	6.80	311	175	3.9

Between 1969 and 1975, several local grape cultivars for white wines were evaluated at SCDCPN Dăbuleni. Average grape production varied considerably, ranging from 23.95 t/ha for the 'Roșioară' cultivar to 6.80 t/ha for the 'Grasă de Cotnari' cultivar.Regarding berry characteristics, the 'Parmac auriu' cultivar recorded the highest weight of 100 berries (314 g), while the 'Fetească regală' cultivar showed the lowest value (176 g). In terms of sugar accumulation, the 'Frîncușe' cultivar achieved the highest content (184 g/L), whereas the 'Parmac verde' cultivar had the lowest (138 g/L). Titratable acidity values ranged from 3.1 g/L for the 'Roșie neagră' cultivar to 5.5 g/L for the 'Mustoasă de Măderat' cultivar (Table 1).

Table 2.

Production and quality of some grape cultivars for red wines during the period 1970-1977 (Vlădoianu, 1984)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Băbească neagră'	14.5	186	167	5.0
'Bătută neagră'	14.5	262	164	4.2
'Fetească neagră'	8.5	141	201	4.2

According to the research conducted by Vlădoianu (1984), the production of local grape cultivars for red wines during 1970–1977 ranged from 14.5 t/ha for the 'Băbească neagră' and 'Bătută neagră' cultivars to 8.5 t/ha for the 'Fetească neagră' cultivar. The highest weight of 100 berries was observed in the 'Bătută neagră' cultivar (562 g), while the lowest was recorded for 'Fetească neagră' (141 g). In terms of sugar content, 'Fetească neagră' registered the highest value (201 g/L), whereas 'Bătută neagră' had the lowest (164 g/L). Titratable acidity varied between 4.2 g/L for

the 'Bătută neagră' and 'Fetească neagră' cultivars and 5.0 g/L for the 'Băbească neagră' cultivar (Table 2).

For table grape cultivars evaluated during 1971–1977, grape production ranged from 27.1 t/ha for the 'Țîța caprei' cultivar to 9.9 t/ha for the 'Coarnă albă' cultivar. The greatest weight of 100 berries was recorded for 'Razachie albă' (505 g), while the lowest was for 'Țîța caprei' (293 g). Sugar content values ranged from 155 g/L for 'Coarnă albă' to 125 g/L for 'Țîța caprei'. Titratable acidity ranged between 4.5 g/L in the 'Ceauș roșu' and 'Coarnă albă' cultivars and 5.8 g/L in the 'Țîța caprei' cultivar (Table 3).

Table 3.

Production and quality of some table grape cultivars during 1971-1977 (Baniță &Vlădoianu, 1979)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Țîța caprei'	27.1	293	125	5.8
'Razachie roșie'	16.1	337	131	5.2
'Razachie albă'	15.8	505	134	4.7
'Ceauș alb'	12.5	316	150	4.7
'Ceauș roșu'	11.3	457	136	4.5
'Coarnă albă'	9.9	334	155	4.5

Between 1992 and 1994, grape production of the 'Roșioară' cultivar ranged from 11.5 to 16.0 t/ha. The weight of 100 berries varied across the period, with the highest value recorded in 1994 (210 g) and the lowest in 1993 (157 g). Sugar content was 168 g/L in both 1992 and 1994. Titratable acidity ranged between 2.6 and 3.0 g/L (Table 4).

PRODUCTION AND QUALITY OF SOME GRAPE CULTIVARS IN THE PERIOD 1990-2000

Grape production and quality parameters were monitored for major cultivars over this decade. This period demonstrates the performance of prominent cultivars, such as 'Roșioară' and 'Băbească neagră', in terms of yield, berry characteristics, sugar accumulation, and acidity (Tables 4–6).

Research by Vladu et al. (1998) shows that between 1973 and 1997, average grape production of the analyzed white and rosé wine cultivars ranged from 17.87 t/ha for the 'Roșioară' cultivar to 5.55 t/ha for the 'Grasă de Cotnari' cultivar.

Table 4.

Production and quality of the 'Roșioară' cultivar during 1992-1994 (Șchiopu, 1997)

The year	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
1992	16.0	198	148	3.0
1993	11.5	157	160	2.8
1994	11.6	210	168	2.6

The highest sugar content was observed in 'Grasă de Cotnari' (182 g/L), while the lowest was recorded for 'Parmac' (138 g/L). Titratable acidity varied between 3.68 g/L for 'Roșioară' and 5.44 g/L for 'Parmac' (Table 5).

Table 5.

Production and quality of some grape cultivars for white and rosé wines during the 1973-1997 (Vladu et al., 1998)

Cultivar	Average production (t/ha)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Roșioară'	17.87	149	3.68
'Parmac'	16.07	138	5.44
'Mustoasă de Măderat'	13.33	155	5.19
'Berbecel'	11.88	152	4.98
'Fetească regală'	9.80	170	4.62
'Galbenă de Odobești'	9.32	160	4.73
'Crâmpoșie'	9.28	155	4.50
'Iordană'	8.34	165	4.49
'Tămâioasă românească'	5.92	179	4.07
'Grasă de Cotnari'	5.55	182	4.37

During 1990–2000, the 'Roșioară' cultivar recorded a grape production of 19.0 t/ha, a weight of 100 berries of 184 g, sugar content of 180 g/L, and titratable acidity of 4.5 g/L. The 'Băbească neagră' cultivar showed a production of 13.8 t/ha, a weight of 100 berries of 176 g, sugar content of 175 g/L, and titratable acidity of 4.0 g/L (Table 6).

Table 6.

Production and quality of some grape cultivars in the period 1990-2000 (Vladu et al., 2000)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Roșioară'	19.0	184	180	4.5
'Băbească neagră'	13.8	176	175	4.0

PRODUCTION AND QUALITY OF SOME GRAPE CULTIVARS IN THE PERIOD 2012-2020

Recent evaluations focused on both local and foreign cultivars cultivated at SCDCPN Dăbuleni. This period provides insights into trends in production, berry size, sugar content, and titratable acidity for white, red, and table grape cultivars, as presented in Tables 7–9.

Table 7.

Average grape production and its quality in some local table grape cultivars produced on sandy soils in southern Oltenia during the period 2012-2016 (Rățoi, 2017)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Victoria'	11.48	688	154	3.7
'Silvana'	8.59	290	162	4.8
'Timpuriu de Cluj'	8.69	246	156	4.0
'Tamina'	5.80	564	156	3.3
'Someşan'	8.56	354	158	3.7
'Splendid'	8.31	702	168	4.2
'Napoca'	10.48	528	152	3.4
'Otilia'	12.12	278	166	4.2
'Transilvania'	80.49	610	158	4.7

During 2012–2016, among table grape cultivars, the highest grape production was recorded for the 'Otilia' cultivar (12.12 t/ha), while the lowest was for 'Tamina' (5.80 t/ha). The weight of 100 berries reached its maximum in 'Splendid' (702 g) and its minimum in 'Silvania' (290 g). Sugar content was highest in 'Splendid' (168 g/L) and lowest in 'Napoca' (152 g/L). Titratable acidity ranged from 3.3 g/L in 'Tamina' to 4.8 g/L in 'Silvania' (Table 7).

Table 8.

Average grape production and its quality for some local red wine grape cultivars during the period 2013-2017 (Rățoi, 2018)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4 (g/L)
'Băbească neagră'	10.50	254	189	5.1
'Haiduc'	13.17	208	178	5.2
'Codană'	14.43	243	164	4.2
'Mamaia'	10.82	237	179	4.2
'Novac'	15.43	252	200	4.6
'Cristina'	12.60	205	182	5.1
'Pandur'	12.80	209	179	4.9
'Arcaș'	11.71	170	189	5.1
'Amurg'	12.86	253	187	4.5
'Busuioacă de Bohotin'	6.80	230	196	4.7

For red wine grape cultivars during 2013–2017, grape production varied between 15.43 t/ha for 'Novac' and 6.80 t/ha for 'Busuioacă de Bohotin'. The highest weight of 100 berries was observed in 'Amurg' (253 g), and the lowest in 'Arcaș' (170 g).

Sugar content was highest in 'Novac' (200 g/L) and lowest in 'Codană' (164 g/L). Titratable acidity ranged from 4.2 g/L in 'Codană' and 'Mamaia' to 5.2 g/L in 'Haiduc' (Table 8).

Research by Rățoi et al. (2021) shows that between 2013 and 2022, grape production of local white wine cultivars ranged from 17.04 t/ha for the 'Selena' cultivar

to 8.71 t/ha for 'Donaris'. The weight of 100 berries was highest in 'Blasius' (288 g) and lowest in 'Columna' (155 g). Sugar content reached its maximum in 'Selena' (222 g/L) and its minimum in 'Columna' and 'Donaris' (166 g/L). Titratable acidity varied between 3.0 g/L in 'Alb aromat' and 4.8 g/L in 'Blasius' (Table 9).

Table 9.

Average grape production and its quality for some local grape cultivars for white wines during the period 2013-2020 (Rățoi et al., 2021)

Cultivar	Average production (t/ha)	Weight of 100 berries (g)	Total sugar content (g/L)	Total titratable acidity H_2SO_4(g/L)
'Columna'	9.47	155	166	3.8
'Donaris'	8.71	178	166	3.9
'Fetească albă Cl. 1 Od. '	13.91	181	188	3.4
'Fetească regală Cl. 21 Bl. '	15.24	172	177	3.8
'Alb aromat'	11.74	282	188	3.0
'Blasius'	15.53	288	172	4.8
'Selena'	17.04	218	222	4.2

CONCLUSIONS

There is a growing recognition of the importance of native grape cultivars, which preserve viticultural heritage and contribute to wines and table grapes with superior quality and authenticity.White wine cultivars such as 'Roșioară' and 'Selena' consistently showed high yields and sugar content across periods, while cultivars like 'Grasă de Cotnari' and 'Donaris' had lower production. Red wine cultivars, including 'Băbeascăneagră' and 'Novac', demonstrated stable productivity and sugar accumulation, supporting their use in high-quality wine production.Table grape cultivars such as 'Țîțacaprei', 'Otilia', and 'Splendid' displayed high variability in production and berry characteristics, highlighting their potential for both fresh consumption and processing.Overall, the study highlights the importance of preserving, promoting, and utilizing native grape cultivars due to their adaptability, quality traits, and role in maintaining Romania's viticultural identity.

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