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# IDENTIFICATION, CHARACTERIZATION, AND MARKETING OF LOCAL GRAPE CULTIVARS FROM SIBIU COUNTY, ROMANIA

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## Abstract

The study was conducted during 2021-2022 growing seasons in the Cisnădioara area of Sibiu County, focusing on the identification of some local grape cultivars. The research involved ampelographic description but also the determination of biometric characteristics to establish the physical-mechanical properties of the grapes, and the yield of grape juice. Most cultivars, apart from the local cultivar 'Tâța caprei' the other cultivars exhibited chemical profiles suitable for use as both table grapes and wine production. Standard research methods were applied in the field and for samples analysis in the laboratory. Most of these cultivars yielded table grapes and for winemaking using simple technology, resulting in the well-known "home wine". This type of wine is increasingly popular among consumers who appreciate light wines with lower alcohol content and persistent aromas, which are rarely found in wines made from noble varieties.

## • Introduction

Viticulture addresses a wide range of theoretical and practical considerations concerning grapevine growing, including technologies for getting planting material, the vineyards establishment and management, as well as technologies for the vineyard maintenance [10]. Grapevine crop is important to the national economy both socially and economically. Socially, grapevine cultivation serves as a vital source of dietary improvement and nourishment for human livelihoods [19]. The economic importance can be appreciated through the effective utilization of some poorly productive lands (slope and sand lands), the supply of raw materials for other industries, stimulation of industrial production development, source of income, facilitation of international trade relations, and enhancement of environmental aesthetics [17]. Significant presence in almost all stages of the human society evolution, wide spread areas in the world, diversified and constantly increasing grape production, are convincing arguments that grapevine can and must be appreciated as particularly very important crop and economically viable [16]. When left unmanaged, the vine produces, like the wild one, many small grapes with small berry, with little and sour must, the yield is gradually far away on the climbing vine [4]. A constant population is necessary to ensure the complicated agro-technical procedures that regulate and guide the growth and fruiting processes, consequently avoiding such a phenomenon [14]. An unaltered population is the only way to guarantee the complicated agro-technical procedures that regulate and guide the growth and fruiting processes, thereby preventing such a phenomenon [13]. This statement is supported by the proofs that ancient peoples had a sophisticated grapevine growing, with a special ranking of vineyard management [11]. The grapevine growing and winemaking knowledge that was passed down and enhanced from generation to generation helped to continuously raise the quality of the grapevine by-products, bringing the respective locations the kind of notoriety that could only be attained by continuous human habitation [18]. The researches of the great Romanian academician and botanist Emil Pop, contributed to the discovery on the Romania territory of over 300 locations, where the grapevine can be found in its wild form [8]. Therefore, it can be stated that in this territory the cultivated grapevine (*Vitis vinifera sativa*) was found, from the beginning, in its original, own area [15]. The objective of the research was to identify local varieties from several locations in Sibiu County.

## • Material and method

The study was conducted from 2021 to 2022, in several private properties in the area of Sibiu County. At an average height of 411 meters, the landscape is made up of hills and terraces. Local grape varieties in the area include Fetească Albă, Traminer Rose, Sauvignon Blanc, Muscat Ottonel, Fetească Regală, and Italian Riesling, vary depending on the season, weather conditions and environment specific to each location. Sibiu and the surrounding nature character

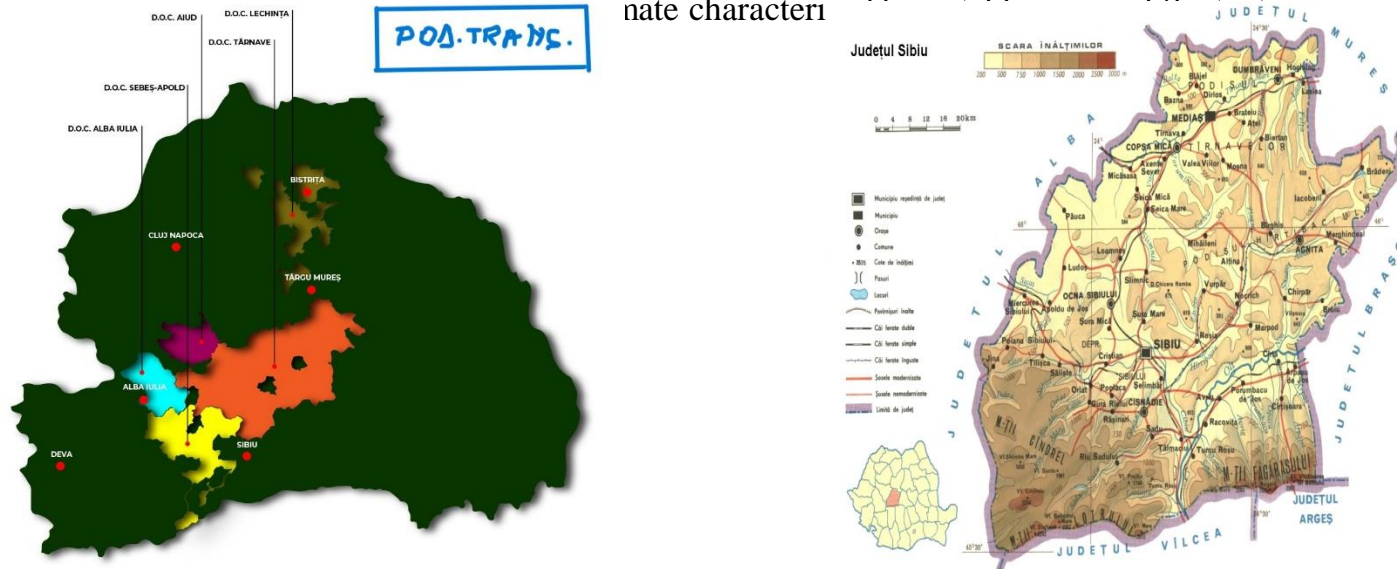


Figure 1. The map of Transylvania Plateau (<https://winemenu.ro/podgorii/transilvania/>)

Figure 2. The map of Sibiu County (<https://pe-harta.ro/sibiu/>)

The research focused on identified local grape varieties, as regards their descriptions and determining their biometric characteristics, with the aim of establishing the physical-mechanical characteristics of the clusters, as well as the grape juice yield. Except for the local cultivar Tâța Caprei, the other cultivars exhibited chemical characteristics that could qualify them as mixed varieties suitable for both table grapes and winemaking. The study employed standard methods typically used in this type of research. Local cultivars identified as interesting for further study were taken to the laboratory, where collected clusters were initially photographed alongside the corresponding leaves and described from an ampelographic perspective. The clusters were then separated into component parts, respectively: rachis, berries, skin, and seeds. Each component was weighed and recorded separately. The physical and mechanical analysis of grapes is particularly important for wine grape varieties, as the ratio between components highlights the must yield of the grapes.

Most of the local analyzed cultivars are grown in family gardens using a very simple technology that involves pruning and, at most, one or two applications of copper sulphate. These practices do not include fertilization or summer pruning. Under these conditions, local cultivars demonstrated well to excellent resistance to fungal diseases and specific grapevine pests, with minimal signs of damage that did not significantly influence grape production or quality.

Many of these cultivars produce grapes suitable for both fresh consumption and basic vinification methods, resulting in the well-known homemade wines that are increasingly popular among consumers. These wines are lighter in alcohol and have persistent aromas, which are becoming rarer in wines made from noble varieties. This is due to the lower thermal balances causing increased sugar accumulation and, consequently, higher alcohol in the wine.

While the physical and mechanical structures of these local cultivars may not offer the yield and efficiency of noble varieties, they should be considered for their typicality and ability to produce less processed wines. Moreover, their cultivation follows less invasive technologies that align well with environmental sustainability.

## • Results and discussions

The physical-mechanical characteristics of the grapes from the studied local varieties reveal the proportions between the components of the clusters, which are particularly important, especially when considering flesh weight, as this determines the must yield. A cluster has the same structure as the inflorescence from which it originates and is formed from the rachis, the peduncle, pedicel and berries [7].



Physical-mechanical characteristics of the grapes, in local cultivar Bob bățut

Sample	Cluster weight (g)	Healthy berries		Skin (g)	Seeds		Flesh (g)	Injured berries		Rachis (g)	Sugar (g/l)
		No.	g		No.	g		No.	g		
Cisnădioara 1	108.5	47	107.0	42.0	65	7.0	36.0	2	1.0	1	127.0
Cisnădioara 2	103.0	42	101.5	39.0	56	5.0	31.0	1	0.5	0.5	124.0
Cisnădioara 3	104.0	43	101.0	38.0	58	6.0	33.0	2	1.0	1.5	128.0
Cisnădioara 4	89.5	32	86.0	32.0	39	3.0	29.0	3	1.5	1.0	130.0
Cisnădioara 5	95.0	37	93.0	34.0	42	4.0	30.0	2	1.0	1.0	121.0
Cisnădioara 6	100.0	40	98.0	37.0	52	5.0	31.0	2	1.0	1.0	126.0

The mechanical and chemical composition of the grapes is influenced by the climatic conditions, cultivation practices, grape ripening and maturity, soil structure, and crop health [6]. It should be noted that all the mechanical components of the grapes are important for the winegrowers and especially winemakers' requirements [16].

For a viticulturist, it is extremely important to understand the components of the cluster, respectively the ratio between certain components [5]. For example, rachis accounts for 2.0% to 10.0% of the total cluster weight. As the berries advance in ripening and the dormant phase approaches, the weight of the rachis decreases, reaching the mentioned values, although in the dormant phase its weight vary between 10.0 and 20.0%. The ratio between cluster and flesh weight can be considered as mark for classifying certain grape types into technological class

Physical-mechanical characteristics of the grapes, in local cultivar Cisnădioara

Sample	Cluster weight (g)	Healthy berries		Skin (g)	Seeds		Flesh (g)	Injured berries		Rachis (g)	Sugar (g/l)
		No.	g		No.	g		No.	g		
Bob bățut 1	121.0	105	120.0	43.0	202	15.0	35	13	7.0	4.0	21.0
Bob bățut 2	128.0	92	117.0	38.0	180	13.0	30.0	5	3.0	2.0	24.0
Bob bățut 3	127.0	78	116.0	35.0	153	8.0	32.0	5	2.0	2.0	26.0
Bob bățut 4	120.0	91	116.0	36.0	157	9.0	29.0	7	4.0	2.0	21.0
Bob bățut 5	129.0	92	119.0	38.0	163	10.0	33.0	11	6.0	3.0	25.0
Bob bățut 6	125.0	90	117.0	38.0	171	11.0	31.0	10	5.0	3.0	23.4

Physical-mechanical characteristics of the grapes, in local cultivar Alb de Cisnădioara

Sample	Cluster weight (g)	Healthy berries		Skin (g)	Seeds		Flesh (g)	Injured berries		Rachis (g)	Sugar (g/l)
		No.	g		No.	g		No.	g		
Alb de Cisnădioara 1	116.0	35	111.5	55.0	94	7.0	38.0	1	0.5	1.0	180.0
Alb de Cisnădioara 2	105.0	30	99.5	50.0	88	6.0	32.0	-	-	1.5	190.0
Alb de Cisnădioara 3	124.5	40	122.0	60.0	102	8.0	40.0	2	1.0	1.0	175.0
Alb de Cisnădioara 4	119.0	36	112.0	52.0	90	7.0	37.0	-	-	0.5	195.0
Alb de Cisnădioara 5	93.0	30	105.5	53.0	96	7.0	33.0	1	0.5	1.0	170.0
Alb de Cisnădioara 6	111.5	34	110.0	54.0	94	7.0	36.0	1	0.5	1.0	182.0

When examining the grape must yield of the studied local cultivars, the percentage of berry flesh is an essential factor in analyzing the mechanical structure of the grapes. This analysis is important for several reasons: it aids in selecting winemaking approaches based on grape components, assesses harvest health and must yield, and helps to guide the development of winemaking processes such as fermentation and storage [2, 9]. Additionally, this analysis allows the determination of the grape's structural index, which typically ranges from 10.00 to 50.00, with lower values observed in grape wine cultivars and higher values in table grape cultivars. It also enables the calculation of the compositional index of the berry, which has similar characteristics across table and wine grapes.

## • Conclusions