STUDY OF SOME PEDOCLIMATE FACTORS THAT CHARACTERIZE THE VINEYARD AREA FROM DRAGASANI

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ABSTRACT

This paper presents geological aspects regarding the territory of Dragasani vineyard, an area belonging to the molasses area known in the literature as Getic Depression, an area located on Pleistocene deposits made of clays, sands and gravels.

INTRODUCTION

Soil and climate are the primary environmental factors to which the grapevine is subjected. For this reason, terroir-related studies mainly focused on the effects of soil and climate on typicity and quality expression of win (Hunter, J.J. and Bonnardot, V., 2011). The three main parameters of terroir—soil, cultivar, and climate (through the vintage effect)—were studied simultaneously. The highly significant effects of these three parameters on vine development and berry constitution are shown. The effect of climate was greatest on most parameters, followed by soil and cultivar (van Leeuwen C. e.a., 2004). Functioning of the terroir relies on the relation between climate, soil and vine. In addition to this interaction, a comprehensive study concept for terroir requires the consideration of viticultural and enological sciences and techniques necessary to ensure the assurance of wine quality, together with spatial aspects of the grapevine response to environmental factors, as required for vineyard management (Deloire A. e.a., 2005). The seasonal morphological development of bunches and eventual chemical composition of the berry result from the interaction between the chosen soil and accompanying climate and the consequences of long term practices (e.g. establishment techniques, row orientation, vine spacing, and trellising, training and pruning systems), short term practices (e.g. seasonal irrigation, fertilisation and canopy management) and harvest criteria applied by the grower (Hunter, J.J. and Bonnardot, V., 2004). Grape cultivation is highly dependent upon climate. Winegrowing requires very special conditions, namely: an average growing-season temperature between 12ºC to 24ºC (Jones, G.V., 2007). The grape quality is affected by solar radiation and rainfall, frost intensity and duration, temperature variability and humidity levels during the growing season (Nemani, R.R., e.a., 2001). High temperatures during ripening are beneficial for the accumulation of sugars, anthocyanin's, flavours, acidity, while low temperatures in early bud-break stage can cause great damage to grapevine or in harvest season when yield and quality of grapes and wine are influenced (Jordão, A.M. e.a., 2015). Mean climatic data and indices are seemingly not sufficient to properly understand variation in climatic conditions and, consequently, to quantify the impact on grapevine physiological behaviour at a particular location. This may lead to the selection and zoning of only apparently homogeneous terroirs, resulting in heterogeneous grapevine response. In this regard, the duration inside and outside an optimum range, and including extreme climatic conditions, would add

value to climatic profile quantification aimed at grapevine physiological

MATERIAL AND METHOD

Sampling on the soil profile, in the field:
- in this phase determinations and observations were made regarding the relief, the morphological characters of the soils, of the parent material, of the phreatic level, of the texture on horizons, of the presence of alkaline-earth carbonates by direct determinations with HCl 1/3 and so on and a preliminary diagnosis and classification of soils was performed according to the official classification (S.R.T.S. 2003);

requirements and behaviour (Hunter, J.J. and Bonnardot, V., 2011).
- collecting soil samples on genetic horizons;
- packaging and labeling of each sample;
- determination of the hygroscopicity coefficient - Micherlich method;
- determinations and analyzes of apparent density were also performed (Yes);
- specific density (D).

RESULTS AND DISCUSSIONS

Valcea County owns 1.65% of the total agricultural area of the country with 245,202 ha. The situation of its distribution by modes of use being presented in Table 1.

Table 1

Distribution of agricultural area by modes of use

Specification	Hectares
Arable	81.595
Pastures	106.646
Woods	40.287
Vines	3.716
Orchards	12.958

The study area rests on a foundation belonging to the Wallachian Platform and functioned as a sedimentation zone until the end of the Pliocene, when there was a marked withdrawal of water, as evidenced by the fact that the lower Pleistocene deposits that continue to settle over the Levant are fluvial lake nature. At the end of the Lower Pleistocene the area was completely removed from the influences of the waters. In the Quaternary, the exogenous processes of denudation and accumulation took place, as well as the formation of terraces along the Olt. The deposits that emerge in this area belong to the Lower Pleistocene.

The sedimentary formations of the Getic Depression correspond to the Paleogene-Quaternary interval, sum up thicknesses of thousands of meters and are supported on a mixed foundation; part of Carpathian origin, in the northern half, and part belonging to the Wallachian Platforms, in the southern half.

The bedrock is represented by sloping, finely or moderately finely discordant slag-disintegrating-altering deposits. They are not texturally blatantly discordant. These rocks influenced the soils by the action of permeability, by their chemical composition and by their influence on the vegetation. It should be noted that texture, as a fundamental property of the soil, with a particularly important role, largely determines the physical behavior of the soil, with a special role in determining most of the other physical properties, as well as

chemical ones. The percentage of clay frames the soil in the optimal range in terms of texture. From this point of view, deep unclogging can be practiced.

The best developments of the vine, both quantitatively and qualitatively, are recorded on soils where clay below 0.002 mm is between 13-50%, being very common here.

Stagnant preluvosol, weak pesudogleized, strongly decarbonated, deep, with loam / loam-clay texture, formed on slope disaggregation-alteration materials consisting of medium materials, underlying mesobasic rocks, vineyard.

Morphological characteristics:

Their soil profile is of type: Ap – Ao - A / Bt1 – Bt2 - B / C (Figure 1).

Ap horizon = 0-14 cm, gradual transition, brown-gray color (10YR - 3.5 / 3.5), clayey texture, small glomerular structure, poorly developed, plasticity, adhesiveness, porous, frequent roots.

Ao horizon = 14-23 cm, gradual passage, dark brown color (10YR-3,5 / 3), clayey texture, small subangular polyhedral structure, poorly developed, plasticity, adhesiveness, fine pores.

Horizon A / B = 23-45 cm, dark yellowish brown color (10YR - 4/4), loamy-clay texture, small subangular polyhedral structure, poorly developed, plastic, adhesive, fine pores, weakly compact, thin thin roots, passage gradually.

Bt1 horizon = 45-81 cm, yellowish color (10YR - 4/5), loamy-clayey texture, medium angular polyhedral structure, plastic, adhesive, fine pores, gradual passage.

Bt2 horizon = 81-119 cm, dark yellowish color (10YR - 5/4), loamy-clay texture, polyhedral angular structure, plastic, adhesive, fine pores, gradual passage.

B / C horizon = 119-175 cm, light orange-yellow color (10YR - 6/5), clay-clay texture, poorly structured, plastic, very adhesive, fine pores, compact.

Physical characteristics:

On the Ap horizon, the apparent density is very low, the total porosity is very high, the soil is not compacted, the wilting coefficient is high, the permeability is high.

On the Ao horizon, the apparent density is medium, medium porosity, poorly compacted soil, high wilting coefficient, medium permeability.

On the A / B horizon, the apparent density is high, very low porosity, poorly compacted, very high wilting coefficient, low permeability.

On the Bt1 horizon, the apparent density is high, the total porosity is very small, moderately compacted soil, very high wilting coefficient, low permeability.

For the Ap horizon, the soil reaction is weakly acidic, the total nitrogen content is very low, the mobile phosphorus content is moderate, the mobile potassium content is low, the nitrogen index is low, the humus content is low.

For the Ao horizon, the soil reaction is weakly acidic, the total nitrogen content is very low, the mobile phosphorus content is low, the mobile potassium content is low, the nitrogen index is low, the humus content is very low.

For the A / B horizon, the soil reaction is weakly acidic, the total nitrogen content is very low, the mobile phosphorus content is low, the mobile potassium content is low, the nitrogen index is low, the humus content is very low.

For the Bt1 horizon, the soil reaction is weakly acidic, the total nitrogen content is very low, the mobile phosphorus content is very low, the mobile potassium content is low, the nitrogen index is low, the humus content is extremely low.

The area is part of the average annual isotherm of 10-11 oC, and the temperature of October is 10-11 oC, being equal to or slightly higher than the annual average. The wide corridor of the Olt valley favors the penetration of

warmer air masses from the south, this fact explains the penetration of the annual average of 10 oC, up to the mountainous region, north of Râmnicul Vâlcea. In this area of Drăgășani, a climatic complex is created with variability of nuances determined by relief, slopes and exhibitions, lithology, degree of coverage with vegetation and large surface of the accumulation lakes in the east. In general, with small and insignificant differences, one can distinguish the existence of two local topoclimates: one of valley corridor and one of hills.

The average annual temperature is 10.6 ^{o}C, with average monthly values between -1.7 oC (January) and 22.1 ^{o}C (July).

In hot years it can reach an average of 12.6 ^{o}C, and in cool years at 9.1 ^{o}C.

The sum of temperatures and precipitation over some of the is presented in the table 2.

Table 2

The sum of temperatures and precipitation over some of the characteristic periods

Interval	Sum of temperatures (^{o}C)	Average temperature per range (^{o}C)	The amount of precipitation (mm)
I.III-31.X	3735.2	15.2	417.6
20.IV-10.X	3131.0	18.1	323.6
I.V-10.X	3026.6	18.6	306.5

Table 3

The monthly average distribution

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Ppm (mm)	29.4	36.2	31.7	52.9	68.8	66.6	63.6	41.5	41.8	39.8	38.1	42.7	555.2

Figure 1 - Soil profile PRELUVOSOL

The temperature but also the monthly precipitations, annual or on characteristic periods, or the maximum ones falling in 24 hours, are presented in the tabular annexes. It should be mentioned that the average annual rainfall for the period 1896-1955 was 578.8 mm; those from 1938-1980 were 630 mm; those from 1950-1980 were 658.8 mm. There is an increase in the annual rainfall since 1938 and, since 1986 and until now, they decrease again, the average of recent years being 555.2 mm, with the following average monthly distribution presented in the table 3.

CONCLUSIONS

The relief is characterized by interfluvial peaks with steep slopes, parallel to the Olt River and oriented from N to S. The altitude of the hills increases from S to N giving rise to various exhibitions, favorable to the cultivation of vines.

The soil presented a loamy texture on the surface, loamy on the profile and clayey on the base, not compacted on the surface, weakly and moderately compacted on the profile, with high to low permeability and medium to high water retention capacity.

The soil was low in humus, showed a slightly acidic to neutral reaction at the surface and weakly alkaline to the base, a very low content of total nitrogen, medium to low content of mobile phosphorus, and a low content of mobile potassium and iron.

The average annual temperature, moderate rainfall and vegetation during the period induce favorable climatic conditions for the cultivation of vines. This set of pedo-climatic conditions favors the cultivation of vines and the creation of quality wines.

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