

Original Article

Favourable Conditions for Establishing a Culture of *Vaccinium Corymbosum* (Blueberry) in Maramureş County, Romania

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Abstract

For crop success in agricultural practice, consideration should be given to the location of crops and also to plants preferences for optimal pH limits, a criterion for the classification of plants for their adaptability to the environment. Blueberry crops - *Vaccinium corymbosum* fruit shrubs are successfully cultivated in Romania. High *Vaccinium corymbosum* shrub, native from North America is related with blueberry bush that exists in the spontaneous flora from Romania. It prefers acidic, wet and rich in organic matter soils and it has been successfully cultivated in Romania for over 50 years. A blueberry plant at full maturity can produce up to 8 kg of fruit depending on the variety, culture substrate, maintenance, cuttings, irrigation water, weather conditions, phytosanitary and fertilization efficiency. This means that on an average of 3,500 bushes per hectare you can get productions of over 25 tons of fresh fruit in the 8-10th year from planting, if blueberry shrubs development is optimal. On a global level, the blueberry consumption has tripled over the past 5 years, and statistics show that this trend, which has been in place for more than 20 years, will continue as more and more people discover the benefits of blueberry consumption.

Keywords: agrochemical indicators, organic matter, *Vaccinium corymbosum*.

1. Introduction

Blueberries have a very high antioxidant content. Of these, blueberries contain phytonutrients with anti-inflammatory properties that stimulate the balanced development of the nervous system and brain health, helping the body to fight oxidative stress.

Regular use of blueberry improves memory and cognitive functions, slows down aging, lowers cholesterol, lowers blood pressure, improves cardiovascular and digestive system functions, protects the retina, has benefits in the fight against cancer.

Blueberries keep their beneficial effects both fresh and after refrigeration. Research has shown that blueberries preserve their intrinsic properties even by refrigerating, which is not usually the case with other fruit (Fig.1, Fig.2, and Fig.3).

The lifetime of good yields is 45-50 years, which makes *Vaccinium corymbosum* a particularly profitable species.

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Agrochemical analysis of the soil is done for the purpose of characterization (appreciation) of the

soil fertility status and then to establish the necessary nutrients to achieve a proposed harvest [1, 2].



Figure 1. *Vaccinium corymbosum* Shrub



Figure 2. *Vaccinium corymbosum* Plantation



Figure 3. *Vaccinium corymbosum* Fruit

2. Material and Method

The soil to be analyzed is taken from the area of Maramures County, characterized by the following physical properties (Table 1). Soil analyzes were performed in accordance with the methodology recommended by [3]. Determination of humus content in the soil was performed through wet oxidation and titrimetric

dosage method (Walkley-Black embodiment, modified by Gogoasă). For the titrimetric method the humus content is calculated according to the content of C-total:

$$\% \text{ Humus} = \% \text{ C-total} \cdot 1.724$$

because of 100 parts of humus, 58% of carbon, $100:58 = 1.724$).

Table 1. Physical Properties of the Soil from Maramureş County

Coarse Sand > 0.2 mm	Fine Sand 0.2-0.02 mm	Dust I + II 0.02-0.002 mm	Clay <0.002	Physical Clay
1.2	36.12	20.59	42.09	45.63

The pH of the soil was potentiometrically determined in aqueous suspension at soil ratio: water 1: 2.5. The results were expressed in pH units with two decimals, with an accuracy of ± 0.05 . The amount of exchangeable bases (S_B) in non-carbonate soils is expressed in m.e. (Ca^{2+} , Mg^{2+} , K^+ , Na^+ , NH_4^+) per 100 g of soil, determined by summing the cations removed from the soil by percolation with a neutral ammonium acetate solution of 1 N, this value being used for the calculation of soil saturation degree (V%) and of the acid addition. The acidity of hydrolytic (Ah) to f it as of the base of the trade has been expressed in m.e./100 g of soil and is determined by titrating the acid that is formed to balance the soil with a 1N solution of sodium acetate or potassium hydroxide, buffered to a 8.2 pH level. The texture influences the thermal, humic, air

and nutritive regime, adsorption capacity, humus accumulation, the conditions for the execution of the soil works, the doses and the periods of application of the fertilizers, the location crops. Since soil texture is largely influenced by applied agrotechnics, it is important to know the soil texture by land appreciation and granulometric analysis in the laboratory. The allocation of a soil in a textural class is done accordingly to the clay proportion ($\phi < 0.002$ mm), dust proportion ($\phi 0.02-0.002$ mm) and sand proportion ($\phi 2-0.02$ mm).

3. Results and Discussions

Following the conducted analyzes, the situation of the agrochemical indicators of the analyzed soil is presented in Table 2.

Table 2. Agrochemical Indicators of the Soil from Maramureş County

Crt. No.	Analyzes Performed	Measurement Unit (M.U.)	Values Obtained
1	pH _{H2O}	-	6.66
2	Hydrolytic Acidity	m.e. /100 g soil	15.47
3	Amount of Bases	m.e. /100 g soil	37.5
4	V _{Ah}	%	70.79
5	Humus	%	1.48
6	Ca ²⁺	m.e.	20.4

Based on these determinations, depending on pH (_{H2O}) and soil texture, depending on hydrolytic acidity (Ah), depending on the degree of saturation in existing bases, the degree of saturation in the desired bases to be achieved, and the amount of exchangeable bases, the analysis reveal a weak acid reaction of the soil, poorly supplied with humus, which reveals that this type of soil is suitable for defining the blueberry culture.

Knowing the soil's reaction and improving it is particularly important because on it depends: the behavior of the crop (blueberry), and the microorganisms in the soil, the mobility of nutrients, soil of herbicides to be applied to produce large hold both quantitatively and qualitatively.

4. Conclusions

The analysis carried out on this soil in Maramureş county show that this type of soil is favorable for setting this crop due to the values of the agrochemical indicators analyzed on this type of soil. Analytical determinations of the pH, hydrolytic acidity (Ah), depending on the degree of saturation in existing bases, the degree of saturation in the desired bases to be achieved, and the sum of the exchangeable bases of humus shows that this type of soil is suitable for defining the *Vaccinium corymbosum* culture.

Following soil analyzes, a very strict soil fertilization and soil conditioning program must be followed to maintain soil acidity in the soil at optimal levels. In terms of *Vaccinium corymbosum* culture,

the limiting factor of is primarily the acidity of the soil. *Vaccinium corymbosum* is suited only on mild, well-drained, acidic and very acidic soils.

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