SOIL RESOURCES AND THEIR FAVORABILITY FOR VARIOUS CROPS IN THE AREA OF IANOVA COMMUNE, TIMIȘ COUNTRY, ROMANIA

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Abstract: *Since ancient times, agriculture has been the basis of the state economy, being the only source of healthy food, and within the reach of every human being. Through this paper we want to encourage as many people as possible to get involved in this field in order to lead a balanced life in terms of profit but also health, but also to know the soil, resources and how they favor certain plants such as would be: wheat, corn, sugar beet, soybeans, peas, beans, potatoes, sunflower, barley. (Astrid 2017) The object of study of the paper will take place in Remetea Mare. The researched perimeter is part of the great physical-geographical unit "Banato-Crișană" (Geography of Romania, vol. I, chap. 10., I. Berindei, E. Nedelcu, 1983). This is one of the three pericarp units being arranged on the western side of the Western Carpathians and includes distinct subunits, but closely linked by the genesis, evolution and use of the territory: Banato-Crișene Hills, Banato-Crișana Plain. (Oancea 2012, Niță 2007) The studied area presents the following categories of use: arable 7,256.08 ha, pastures 1,221.17 ha, hayfields 198.63 ha, orchards 14, 38 ha (Agricultural total = 8,691.08), forests 906.51 ha, waters 203.45 ha, unproductive 39.33 ha, roads 147.05 ha, constructions 137.32 ha, (TOTAL = 10,124.74 ha). (Dragoslav 2016, Dragoescu 2019) In this work we will find: the description of the types of soils in the locality (Alluviol gleic, Eutricambosol gleic, Preluvosol molic-stagnic, Luvosol stagnic, Vertosol gleic) with the surface that each soil occupies, the horizons that make it up, the spread, etc; but also their favorability for various crops for the farmer to adapt for each soil with the plant that best folds on that type of soil. (Borcean 2009)*

Keywords: *agriculture, systems, farmer, soil resources, culture*

INTRODUCTION

The term "agriculture" comes from the Latin word agri meaning "field" and culture meaning "cultivation", in the sense of mechanical and chemical processing of the soil for cultivation.

Agriculture, cultivating the land to grow plants, has been the main productive branch of the beginnings of civilization. (OKROS 2016)

The investigated perimeter is part of the great physical-geographical unit "Banato-Crişana" (BERINDEI & NEDELCU, 1983).

This is one of the three peri-Carpathian units located on the western side of the Western Carpathians and it includes distinct but closely linked subunits through the genesis, evolution and use of the territory:

The Banato-Crişene Hills;

The Banato-Crişană Plain. (MARIN 2017, NIȚĂ 2018)

The territory of the Commune of Remetea Mare is part of the south-western hydrographic systems, the Timiș-Bega River basin. The general characterization of the thermal regime in the studied area is due to the dominant influence of western air masses, on the background to which the influence of other circulatory types act. (BERBECEAN 2014, ASTRID 2017) The average multiannual temperature at the Timisoara station between 1943-2004 recorded values of 10.80C, and monthly average temperatures had the following values: the multiannual average precipitation at Timisoara Station between 1873-1975 was 631 mm,

during 1955-2000 – 591.9 mm, during 1955-2004 – 600.4 mm, the values of the annual media presenting the following oscillations: 390.5 mm (1999-2000) and 908.1 mm (1969-1970). (DUMA 2017, MIHUȚ 2014)

Throughout the year (calendar or agricultural) the number of rainy days oscillated between 120-130, as shown by the records made at Timisoara Station. The soils in the perimeter were formed and evolved by the interaction of complex paedogenic factors, of which the most important are: relief, water, parental rock, climate, vegetation, and man. (Florescu 2014, Marin 2013) Thus, two areas with well-differentiated soils are distinguished in the studied perimeter, resulting in different paedogenetic conditions, and they do not determine the formation of sphenoid, dry, plastic structure. Based on the field study of the main profiles and on the underlying profiles analysed, there are 9 types of soil (and 127 soil subtypes) as follows: aluviosols – 370.10 ha, 4.26%, eutricambosols – 2406.79 ha, 27.69%, preluvosols – 3089.90 ha, 35.55%, luvosols – 360.44 ha, 4.15%, pelosols – 1244.89 ha, 14.31%, vertosols: 454.27 ha, 5.22%, gleiosols – 372.83 ha, 4.28%, stagnosols – 346.42 ha, 3.98%, and erodosols – 47.43 ha, 0.55%.(Mihuț 2018, Dicu 2016)

MATERIAL AND METHODS

1. Determination of physical properties

*Soil texture***-** through the Cernikova method (the principle underlying the pipetting method is the sedimentation of particles into a liquid at different rates, depending on their size, according to Stokes' law).

The determination of the granulometric fractions in weight percentages was done using the following formulas:

Coarse sand (2 - 0.2 mm in diameter) % = $\frac{m_1\ x100}{m_0 xF}$

Fine sand (0.2-0.02 mm in diameter) % = $\frac{100xm_2}{m'}$

Dust (0.02 - 0.002 mm in diameter) % = $\frac{(m_2 - m_3)xVx100}{(Vxm_0)xF}$

Clay (diameter less than 0.002 mm) % = $\frac{m_3 xVx100}{Vxm_0 - dxF}$

Soil density (cm3) - using a pycnometer, using distilled water;

Soil density is calculated using the following formula:

$D = \frac{M_2 - M}{M_1 + M_2 - M - M_3}$ x d

*Apparent density (cm3***)** -the formula by which we calculated the bulk density is as follows:

$$DA = \frac{M_1 - M_2}{V}$$

Total Porosity Pt (%) -was calculated using the following formula: $PT = \left(1 - \frac{DA}{D}\right) x100$

Aerosis Porosity Pa (%). In order to determine it by calculation we used the values of some hydrophysical and physical indices: PA = PT - CC x DA

Setting And Soil Compaction (Gt)

$$GT = \frac{PMN - PT}{PMN} x100$$

PMN = 45 + 0,163 x A

2. Determination of chemical properties

Soil humus content (%) - by titrimetric methods, respectively Tiurin method;

The principle of the method is to oxidize the carbon in the humus with a solution of chromium anhydride or potassium dichromate in the presence of sulfuric acid.

The humus content of a soil sample was calculated using the following formula:

$$\text{Humus\%} = \frac{(V1\ \ V2)\ \text{x f x}\ 0{,}0005181 \text{x}\ 100}{\text{m}}\ \text{x K}$$

pH of the soil solution - according to the potentiometric method, in aqueous extract 1: 2.5;

Total Nitrogen Dosage - was done by Kjeldahl method (soil mineralization is done by boiling with concentrated sulfuric acid in the presence of catalyst);

Mobile Phosphorus - determined by Egner-Rhiem-Domingo on a UV-VIS spectrophotometer;

Assimilable Potassium - extracted into ammonium lactate acetate and determined with atomic absorption spectrophotometer;

Total Cationic Exchange Capacity (T) - determined by the Bower method;

Degree Of Saturation In Bases (V%) - was calculated by the formula:

$$V = \frac{S_B}{S_B + S_H} X100(\%)$$

RESULTS AND DISCUSSIONS

Soil Territorial Unit (SU) No. 11

Name: Gleic aluviosoil

Formula: AS gc G_5 k_4 d_4 T42/T42 – 211/03/60

Area: 45,66 ha; 0,53%

Profiles (Surveys): 29, 174

County: Timiş, Commune: Remetea Mare

SOIL CHARACTERISTICS

Morphological: Displays the following horizons: Ap-Aptg$_{2-3}$-Cg$_4$-Cg$_{4-5}$-Cg$_5$-Cg$_6$-Cg$_5$-Cg$_4$

greyish-yellowish, structure destroyed by soil works, rough

greyish-yellowish with 6-15% rusty spots, structure destroyed by soil works, rough

yellowish with 16-30% purplish spots, rare rusty spots

yellowish with 31-50% purplish-rusty spots, iron-manganese spherical concretions

yellowish with 51-70% purplish and rusty spots, iron-manganese spherical concretions

purplish with 71-90% rusty, iron-manganese spherical concretions, $CaCO_3$ low effervescence

purplish with 51-70% with rusty spots, iron-manganese spherical concretions, $CaCO_3$ low effervescence

rusty with 31-50% purplish, dispersed iron-manganese accumulations, $CaCO_3$ low effervescence

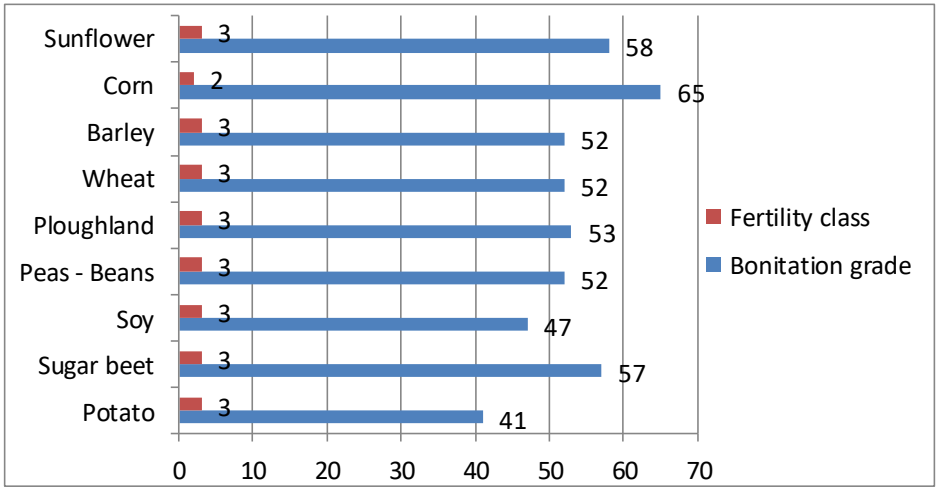

Fig. 1. Bonitation grade and fertility class at No.11

SOIL TERRITORIAL UNIT (SU) No. 57

Name: Stagnic luvosoil

Formula: EL mo-st G1 W2 T52/T52- 122/50

Area: 229,64 ha;2,74%

Profiles (Surveys): 200, 105, 112, 122, 123, 124

County: Timiş, Commune: Remetea Mare

SOIL CHARACTERISTICS

Morphological: Displays the following horizons: Ap-Atp-Amw_2-Btw_2-BCw_3-C

dark brown, large poorly developed polyhedric, blackish-brown, massive, blackish-brown with 20% purplish and rusty spots, small well developed polyhedric, brown, yellowish-brown, reddish-yellowish.

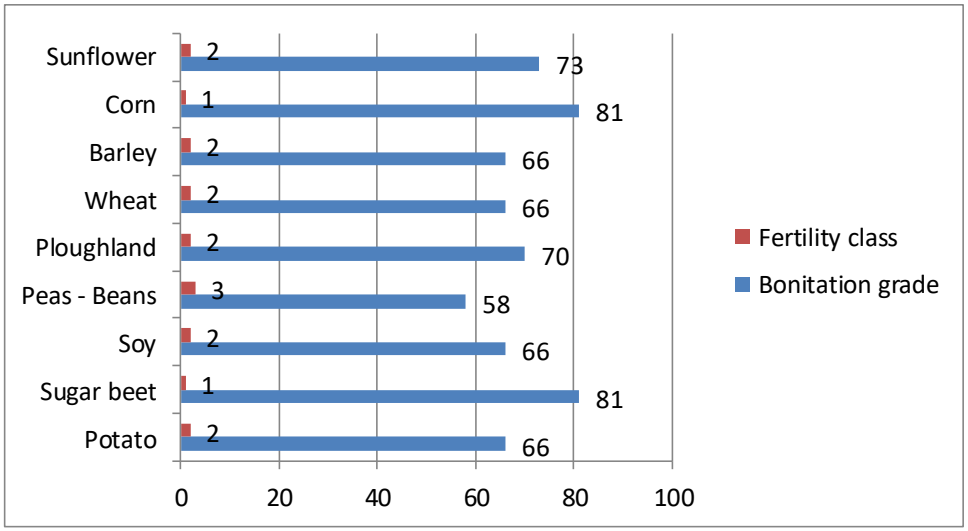

Fig. 2. Bonitation grade and fertility class at No. 57

SOIL TERRITORIAL UNIT (SU) No. 88

Name: Stagnic luvosol

Formula: LV st X_{065} W_2 T43/T52-132/50-e_{11}

Area: 101,63 ha; 1,17%

Profiles (Surveys): 296, 153, 203, 403

County: Timiș, Commune: Remetea Mare

SOIL CHARACTERISTICS

Morphological: Displays the following horizons: Ap-BE-Btw$_2$-Btw-Bt

light grey, with structure destroyed by soil works

light grey low reddish, subangular polyhedric

brown yellowish reddish with 6-15% rusty and purplish spots, iron-manganese accumulations, subangular and angular polyhedric

dark brown with 16-30% rusty and purplish spots, high polyhedric angular low prismatic yellowish-reddish, large polyhedric

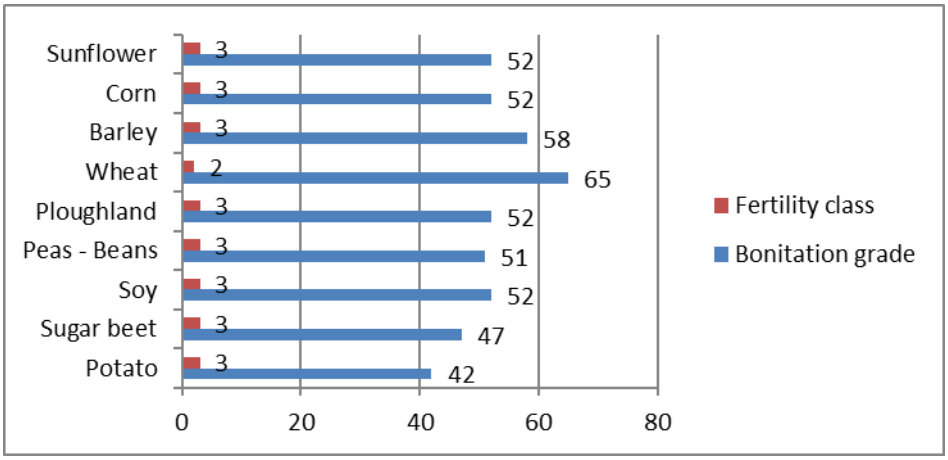

Fig. 3. Bonitation grade and fertility class at No. 88

SOIL TERRITORIAL UNIT (SU) No. 106

Name: Gleic vertosol, strongly gleied (batigleic), baticalcaric, medium argyle clay/clayish argyle, developed on very fine/medium-fine carbonate fluvial matter

Formula: VS gc G_4 k_4 T52/T61 – 211/60/50

Area: 38,93 ha; 0,45%

Profiles (Surveys): 38, 102

County: Timiş, Commune: Remetea Mare

Spread: low plain – corrugated plan

Land aspect: Generally normal with polygonal cracks

Natural conditions in which it occurs: low plain – corrugated plan, developed on very fine/medium-fine carbonate fluvial mater, groundwater 2.01-3.00 m

SOIL CHARACTERISTICS

Morphological: Displays the following horizons: Apg_2-$Atpg_2$-Ayg_3-$Acyg_3$-$Ckyg_4$-$Cykg_{4\text{-}5}$-Ckg_5

brownish-grey 6-15% with purplish spots, iron-manganese spherical concretions, structure disturbed by soil works

yellowish 6-15% with purplish and rusty spots, iron-manganese spherical concretions, structure disturbed by soil works

yellowish 16-30% with purplish spots, rare rusty spots, iron-manganese spherical concretions, large polyhedric, sliding sides

yellowish 16-30% with purplish and rusty spots, sliding sides, rare iron-manganese spherical concretions, prismatic

purplish 50% with rusty spots, sliding sides, iron-manganese spherical concretions, prismatic, $CaCO_3$, low effervescence

yellowish 45-55% with purplish and rusty spots, iron-manganese accumulations, sliding sides, $CaCO_3$, low effervescence

yellowish 60% with purplish and rusty spots, Ca and Na concretions, low effervescence

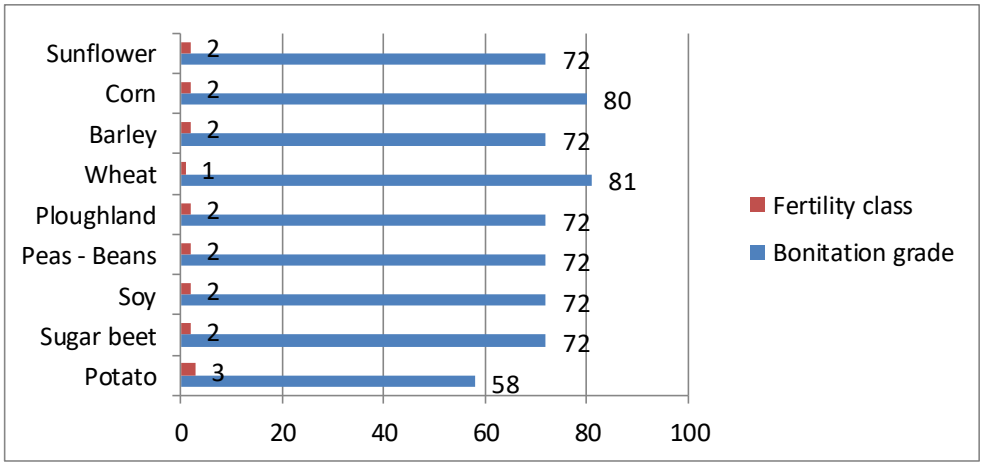

Fig. 4. Bonitation grade and fertility class at No. 106

TERRITORIAL SOIL UNIT (US) No. 21
Name: Eutricambosol gleic
Formula: EC gc G3 T32 / T42 - 212/03/01;
Surface 283.11 ha; 3.26%
Profiles (surveys): 41, 181, 205, 212
County: Timiș Commune: Remetea Mare

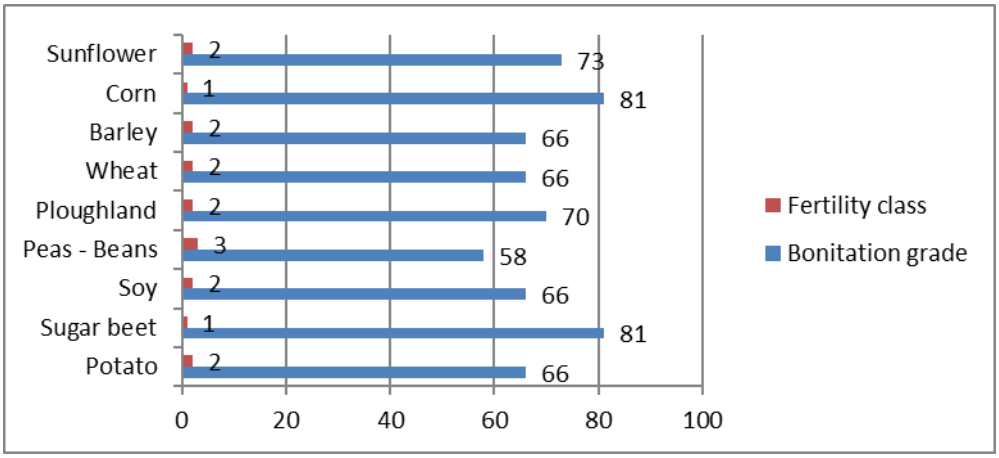

Fig. 5. Bonitation grade and fertility class at No.21

CONCLUSIONS

Within the ground unit no. 11 it is observed that the highest rating is found in the corn crop with 65 points and the lowest rating is the potato crop with 41 points.

Within the ground unit no. 21 it is observed that the highest grading grade is found in the corn crop with 81 points and the lowest grading grade is the pea-bean crop with 58 points.

Within the ground unit no. 57 it is observed that the highest grading grade is found in the wheat crop with 73 points and the lowest grading grade is for the potato crop with 52 points.

Within the ground unit no. 88 it is observed that the highest rating is found in the wheat crop with 65 points and the lowest rating is the potato crop with 42 points.

Within the ground unit no. 106 it is observed that the highest rating grade is found in the wheat crop with 81 points and the lowest rating rating is the potato crop with 58 points.

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