CHARACTERIZATION OF SOIL RESOURCES IN SELEUŞ COMMUNE, ARAD COUNTY

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Abstract: *The object of this study is the lands belonging to the cadastral territory of Seleuș commune, Arad county, respectively the soils identified in the mentioned perimeter. They are studied in relation to the environmental factors that condition their existence, together with them, forming homogeneous ecological territory units (UT or TEO) with specific favouritivities for different agricultural or forestry uses and with specific breeding requirements and technologies. The research is based on the establishment of a sustainable agriculture system, meeting the requirements for the establishment of the scientific database necessary for the establishment of technologies and for the development of measures for the integrated management of agroecosystems. It aims to obtain a fund of information on technical and fertility characteristics in order to determine the current general production capacity of land for different crop plants, respectively different uses, to substantiate technically and scientifically the most appropriate practical measures regarding the rational use and conservation of the land fund, in order to make them available to specialists and also to serve as elements in the composition of the data of M.A.D.R. in order to achieve and update the "National and County Soil-Land Monitoring System for Agriculture", but also to substantiate other programs in the field of activity of the Ministry of Agriculture and Rural Development: implementation of the nitrates directive, application of the provisions of the sewage sludge directive, directive on biofuels, directive on delimitation of disadvantaged areas, climate change, organic agriculture, etc.*

Keywords: *soil cover, agricultural, soil fertility, potential production*

INTRODUCTION

The use of land, as the population continues to grow, has become more and more complex, turning it into an object of labor and a means of production in agriculture, forestry, etc., into a source of raw materials for the manufacturing industry and the physical-geographical space for the location of all the objectives necessary for the development of human society.

Agricultural production is carried out under the influence of various environmental factors, modifies more or less, in relation to man's ever-increasing ability to change them. One of the long-standing concerns of researchers and practitioners has been to find the best indicators of environmental factors and conditions that most accurately express the favorability of plant growth and fruiting (ȘMULEAC, L., ET AL., 2021). All environmental factors have a very different spatio-temporal manifestation (PASCU, R., M., 1983). The criteria and indicators for the characterization and division of homogeneous territorial areas must be distinct for each individual factor, condition or attribute, attributes that manifest themselves in a certain form and in a range of manifestation of the phenomenon both for the entire surface of the Earth and and for the given geographical space (DAVID, G., ET. AL., 2018; RĂUȚĂ, C., 1995).

Knowing the relief is necessary to be able to appreciate the land as a whole, as an element that influences production, as well as to make possible correlations with other

environmental factors related to the relief (in general, pedoclimatic and water conditions) (SOFO, A., ZANELLA, A., PONGE, J.-F., 2019).

The interaction of environmental and soil factors results in two trends, two approaches to the problem (NIȚĂ, L., ET AL., 2018). On the one hand, the totality of the soil characteristics generates the interaction in time and in a defined space the notion of fertility, and on the other hand the way in which all environmental factors are interconnected, to create an optimal state of vegetation, defines the notion of favorability (MIHUȚ, C., NIȚĂ L., 2018; MIRCOV, V. D., ET AL., 2021).

SRTS – 2012+ presents an improved form of SRCS 1980, not changing its structure and keeping its core entities. It achieves a better framing of soils in the system, a more consistent application of diagnostic criteria, the unitary character proving more clearly an increase in the degree of practical applicability and a uniformity of soil terminology. When developing SRTS – 2012+, the best possible proximity to international soil classification systems and especially to the FAO/UNESCO soil list for a better correlation with them was not neglected.

MATERIAL AND METHODS

The aim of the work is the study of the soil and water resources in the Bara area, Timiș county, in the current context in which we find ourselves, given the climate changes that increasingly influence the soil and water resources available in the studied area with repercussions on the entire evolution of plant development. Both soil and water are vital to our life and to the entire planet. If the two resources are insufficient, an imbalance of life on Earth would occur (ROGOBETE, GH., IANOS, GH., 2012).

The health of the soil and the purity of the water are essential to be able to talk about the quality of life, environmental factors (soil, water, climate, air, etc.) can influence the well-being and health of people (RĂUȚĂ, C., CÂRSTEA, S., 1993.

For the preparation of the paper, data obtained both from field observations and data taken from previous researches, OSPA Arad and Seleuș Municipality Hall were used.

In order to achieve the proposed objectives were used the research methods specific to the pedological field: pedological mapping, morphological description, expeditionary field determinations, laboratory analyzes, pedological information processing, etc.

In order to achieve the proposed objectives were used the research methods specific to the pedological field: pedological mapping, morphological description, expeditionary field determinations, laboratory analyzes, pedological information processing, etc. Thus, within the investigated perimeter, based on data recently obtained by direct observation in the field and processed in the laboratory, a number of 4 genetic types of soil were identified. The profiles were placed in representative areas of the researched space so that the most representative types and subtypes of soil could be described. In the case of profiles, samples were collected on pedogenetic horizons, both in natural settlement (unchanged) and in modified settlement.

Also, for the determination of specific chemical indices, agrochemical samples were collected (from the processed layer). The research of ecopedological conditions and morphological description of the researched soil was done according to the "Romanian System of soil taxonomy" (2012), completed and/or modified by the "Methodology of elaboration of pedological studies" (vol. I, II, III) elaborated by I.C.P.A. Bucharest in 1987.

RESULTS AND DISCUSSIONS

1. THE NATURAL FRAMEWORK OF SOIL FORMATION AND EVOLUTION IN SELEUȘ COMMUNE, ARAD COUNTY

1.1. *Relief and Geology*

The territory is part of the eastern marginal area of the Crişurilor Plain, which insinuates itself along the depression corridor of the White Criş (Zărand-Ineu depression bay) and in the Cigher basin. This state boundary of the plain is sinuous and difficult to draw, due to the almost imperceptible interference between the plain and the completed deluvial trains (terraces and lower glaciers), belonging to the hilly area. The contact would take shape on the line of Mocrea-Moroda-Pancota localities. The bumps were mostly blurred due to antorpic activity.

In relief, attempts were made to distinguish some higher forms, the fan of glaciers and lower terraces (alluvial, which descend to the west to altitudes of 117-115 m and are gradually lost in the novelty of the plain. The genesis of these steps was conditioned mostly by the retreat of the Pannonian Lake's base level to the west and several stages of slow regression and stagnation. The retreat of the shoreline (the gradual formation of the plain from east to west) was due to subsidence and the existence of a negative hydrological balance. Neotectonic movements and increasing subsidence have produced the rupture of the existing equilibrium, resulting in strong erosion (in the piedmont area) and an accumulation (in the shore area) when changing the angle of slope. The accumulation was initially submerged (with the development of submerged cones that then turned into deltas). On newly emerged surfaces, there has been an erosion in the web and a lateral divagation (migration) of small rivers, thus forming the steps.

1.2. Hydrography and hydrogeology

The studied perimeter is part of the basin of the White Crişul and its tributary Cigherul. We mention some features, in plain areas, watersheds are uncertain, which favored the swinging of waters from one basin to another, a character that was used in the rectification and regulation of waters anthropogenically, by building new networks: torrential manifestations were frequent, which conditioned priodic floods in the structure of riverbeds in the past. The presence of a solid, abundant flow had the effect of clogging and canting the riverbeds.

The natural flow of the White Crișul is difficult to determine, because in some periods flows are deviated from one river to another, thus accentuating on some rivers the minimum runoff, and on other rivers attenuating it. Sometimes even Crișul reaches a very low minimum flow. Cigherul – springs from the Zarand Mountains at an altitude of 521 0, has a length of 58 km and a basin area of 670 km2. It flows into the Criş River at Chişinău Criş. The regulation of the runoff required the construction of the upstream reservoir at Taut in the origin area. Baziunl Cigher also has some peculiarities, the average monthly runoff is 20.24% in February and 17.0% in March, and from June to December it oscillates between 2.78% and 0.91%, so high amplitudes.

1.3. Climate

The researched territory is characterized by a moderate temperate continental climate with shorter and milder winters being specific to a certain circulation of air masses of various types, circulation imprinted either by action centers of dynamic origin (azoric and subtropical anticyclone) or by seasonal thermal action centers (Siberian anticyclone, Asian or Mediterranean depression).

The investigated area is therefore at the interference of air masses that have an oceanic character of western origin, which often arrive here with a higher degree of continentalization

and continental ones, of eastern origin, but are frequently under the influence of warm air masses of southern origin that cross the Mediterranean Sea. According to Kopen's climate maps (1931), the investigated perimeter falls within the climate province of C.F.B.X., ie a temperate continental climate with oceanic and sub-Mediterranean influences. The characterization of climatic conditions was made based on climatic data recorded at Arad meteorological station.

1.4. Vegetation

From a geobotanical point of view, the researched territory falls within the forest-steppe zone. In the past, oak forests occupied significant areas, especially in the Crișului meadow. Currently, isolated specimens or smaller clumps of *Salix sp*. are found. *Populus alba, Fraxinus excelsior, Robinia pseudoccac*ia, and among the shrubs*: Prunus spinosa, Rosa cannina, Crataegus monogzna, Ligustrum vulgare.* The grassy vegetation is characteristic of the forest-steppe zone with soils such as Cambisdols and Solonets, thus appear Edahic indicator species such as: *Static gmelini, Aster tripolium, Hordeum histerix, Scorzonera laciniata* on solonets.

The following species are found on the pastures of the territory on Cambisols: *Festuca arundanace, Festuca sulcata, Festuca pseudovinia, Lollium perene, Alopecurus heniculatus, Poa pratensis, Trifolium repens, Achillea millefolium, Plantago lanceolata, Potentillo argintea, Thzmus collinus, Lepidium perfoliatum, Ononis hyrcina, Euphorbia ciparisis, Linaria vulgaris, Rumex crispus, Erynginum campestre, Onospordon acanthoides, Cardums sp., Medicago lupulina, Fragaria vesca, Lotus corniculatus.*

1.5. Soil cover

Under normal climatic conditions, rock, vegetation and groundwater, the soils on the territory of Seleuș commune located on the plain, evolved towards the zonal time, carbonate chernozem. The presence of the phreatic level at shallow depth, up to 4 m, determined that all soils were moistened phreatically. Under these conditions, of quasi-uniformity, the differentiations in the soil cover are brought only by microrelief. Thus, due to the well-known forms of loess compaction, the Arad Plain is sprinkled with circular depressions or elongated depressions (crovuses), depressions that receive an increased amount of moisture due to both lateral runoff and larger snow accumulations during winter.

Lunca Crișului is the area of young soils, alluvial alluvial soils and colure layered in various stages of humification with the high groundwater level in which needles imprint a common character, gleization. It is to be noted in the immediate vicinity of the built-up area of Seleus, in the area where the transition from plain to meadow is made gradually, without a visible unevenness, an area that required the raising of a dam to protect the village from floods, the appearance of small areas with poorly salinized alluvial soils, poorly solonetized. Their presence demonstrates some salinization potential, which calls for greater attention to be paid to the use of meadow land.

2. EVIDENCE OF THE LAND FUND OF THE SOIL RESOURCE IN SELEUŞ COMMUNE, JUD. ARAD

2.1. Agricultural land records by soil types SRTS-2012+

Following the research carried out in the area, 7 types of soil were identified as follows: Chernozem 245 ha (4.61%); Faeozem 184 ha (3.46%); Eutricambosol 3887 ha (73.06%); Gleiosol 27 ha (0.51%); Stagnosol 71 ha (1.33%); Vertosol 444 ha (8.35%); Pelosol 462 ha (8,685) all these types are found in 4 soil classes Chernisols 429 ha (8.07%), Cambisols 3887 ha (73.06%), Hydrisols 98 ha (1.84%), Vertisols 906 ha (17.03%).

Table 1

Agricultural land records by soil type

No.	*Soil Class*	*Soil Type*	*Surface (ha)*	*%*
1.	Chernisols	Chernozem	245	4,61
		Faeozem	184	3,46
2.	Cambisols	Eutricambosoil	3887	73,06
3.	Hydrisols	Gleiosol	27	0,51
		Stagnosoil	71	1,33
4.	Vertisols	Vertosoil	444	8,35
		Pelosoil	462	8,68
TOTAL			**5320**	**100**

2.2. Evidența terenurilor agricole pe folosințe

The state of the land fund in Seleuș commune, jud. Arad is presented as follows: total agricultural 5320 ha (100%) with a record of the following categories of use "Arabil" – 4110 ha (717.26%); "pasture" - 1198 ha (22,52 %); "meadow" - 0 (0 %); 'vineyards' – 0 ha (0 %) and 'orchards' 12 ha (0,23 %).

3. PRESENTATION OF SOIL TYPES IN THE STUDIED AREA

3.1. Chernozem poorly glearated, weak leachate, coarse sandy loam/medium sandy loam on loessoid deposits;

Ap 0-16 cm very dark grey brown (10YR3/2) in wet state, dark grey brown (10YR4/2) in dry form, medium developed grain, coarse sandy clay, friable in wet state, hard in dry form, with thin ferecvent roots, weak compact, with fervent pores, weak adhesive, low plastic;

Am16-48 cm very dark brown (10YR2/2) in the wet state, very dark gray brown (10YR5/2) in the dry state, large grain moderately developed, sandy loamy, medium friable in the wet state, moderately cohesive in the dry state, with frequent thin roots, moderately compact, low plastic, low adhesive;

AC 48-66 cm dark brown with yellowish shades (10YR4/3) in wet state, weak yellowish-gray brown (10YR5/3-4) in dry state, moderately developed middle angular polyhedral, medium sandy clay, friable in wet state, moderately cohesive, with thin rare roots, weak compact, weak plastic, weak adhesive;

C 66-80 cm faintly yellowish brown (10YR4/4) in wet state, yellowish greyish brown (10YR5/4) in dry state, middle angular polyhedral developed, medium sandy clay, friable in wet state, moderately cohesive in dry form, weak compact, weak plastic, low adhesive, with moderate effervescence;

CG 80-100 cm yellowish-aubergine brown (10YR5/4) in wet state, yellowish brown vinetium (10YR6/4) in dry form, medium angular polyhedral moderately developed, medium sandy loam, friable in wet state, moderately cohesive in dry state, weak compact, weak plastic, weak adhesive, with moderate effervescence.

3.2. Phaeosome, cambic weak gleached, leachate weak on clays, medium clay/medium clay;

Ap 0-31 cm brown (10YR4/3) in wet state, light yellowish brown (10YR 5/3) in dry state, small glomerular, disturbed by cultivation, medium clay clay, with rare coprolites, thin and frequent roots, firm in wet state, hard in dry state, small and very frequent pores, weak plastic, weak adhesive, loose, dry;

Am 31-44 cm very dark brown (10YR2/2) in wet state, dark brown (10YR3/2) in dry state, medium glomerular well developed, medium clay clay, with rare coprolites, thin and frequent roots, friable in wet state, moderately cohesive in dry state, frequent middle pores, nonplastic, non-adhesive, poorly compact, revival, gradual transition.;

AB 44-55 cm dark brown (10YR3/3) in wet state, brown (10YR5/3) in dry form, small angular polyhedral, moderately developed, medium clay clay, point pheromanganous spots, rare coprolites, frequent thin roots, medium frequent pores, weak plastic, weak adhesive, weak compact, revival, gradual transition;

Bv 55-68 cm dark brown (10YR3/3) in wet form, brown (10YR5/4) in dry form, moderately developed small, medium clay clay with point ferromanganic spots, very thin roots, firm in wet state, hard in dry state, medium pores and frequent, moderate plastic, moderate adhesive, moderately compact, revival, gradual passage.;

BC 68-79 cm yellowish brown (10YR 5/4) in wet state, yellowish brown (10YR6/6) in dry state, medium subangular polyhedral structure, poorly developed, medium clay clay, with very thin and rare roots, firm in wet state, hard in dry state, weak plastic, weak adhesive, moderately compact, gradual transition;

CB 79-91 cm yellowish brown (10YR 5/5) in the wet state, yellowish brown (10YR 6/5) in the dry state, medium subangular polyhedral, medium clay clay, firm in the wet state, hard in the dry state, weak plastic, weak adhesive, moderately compact, gradual transition.

3.3. Eutricambosoil typical strong leached, loamy/loamy on fluvial deposits;

Ao 0-22 cm very pale brown (10YR7/3) in dry state, greyish brown (10YR6/3) in wet state, greasy, dusty clay, frequent thin roots, friable in wet state, moderately cohesive in dry state, frequent middle pores, low plastic, weak adhesive, loose, revived, clear passage, no effervescence;

AB 22-41 cm light brown grey (10YR6/2) dry, greyish brown (10YR5/2) wet, grainy, dusty clay, thin rare roots, friable wet, hard dry, weak plastic, weak adhesive, weak compact, gradual transition, no effervescence;

Bv 41-85 cm brown (10YR4/3) dry, dark brown (10YR3/3) wet, polyhedral angular, medium clay, firm wet, hard dry, rare small pores, moderate plastic, moderately adhesive, moderately compact, gradual transition, no effervescence;

3.4. Gleiosoil, molly, weak carbonate, on fluvial deposits, medium clay clay/medium clay;

Am 0-25 cm brown (10YR3/3) with 8% rust and eggplant stains in wet state, pale (10YR6/4) in dry state, medium developed grain disturbed by cultivation, clay-dusty clay, small ferromangene separations, dense and thin roots, friable to firm in wet state, hard in dry state, non-adhesive, non-plastic, loose with frequent large pores;

AmG 25-38 cm brown (10YR3/3) rust and eggplant spots in proportion of 10%, in wet state, brown (10YR5/3) in dry state, with a deciduous structure, clay-dusty clay, small ferromangene separations, dense and thin roots, firm in wet state, hard in dry state, non-adhesive, non-plastic, moderately compact, fine pores, revival;

ACG 38-52 cm yellowish brown (2.5YR5/4) yellowish eggplant gray spots (5Y5/2) and intense rust spots (7.5YR5/8) on wet material, light yellowish brown (2.5Y6/4) with light olive gray spots (5Y6/2) and rusty brown spots (7.5YR5/6) in dry state, small angular polyhedral poorly developed, medium clay clay, small ferromangonic seprations, dense and thin roots, firm in wet state, hard in dry state, weak plastic, weak compact, frequent medium pores, jilav.;

CAGo 52-66 cm olive gray eggplant (5Y5/2) rusty yellowish shades (7,5Y6/8) wet, light olive gray (5Y6/2) with dark rust (7,5Y5/6) in dry material, small developed angular

polyhedral clay, medium clay clay, small ferromangene separations, rare and thin roots, firm in wet state, hard in dry state, weak adhesive, weak plastic,weak compact, small frequent pores, jilav.

3.5. Stagnosol whitish, on clays, medium clay/medium clay;

Ao w 0-18 cm light brown (10YR5/3) grey eggplant (5GY4/1) reduction colours 25% wet, pale brown (10YR6/3) olive spots (5GY6/1) dry, grainy, medium clay, firm wet, hard dry, low plastic, low adhesive, low compact, revival, thin rare roots;

EaW 18-37 cm bluish grey (10YR7/2)(5GY4/1) reduction colours 55 % wet, light grey (10YR7/1) eggplant stains (5GY6/1) dry, unstructured, medium clay, firm wet, very hard dry, low plastic, low adhesive, moderately compact, revival;

EBW 37-49 cm, rust, faint, brown, aubergine (7,5YR5/3), grey (5GY5/1), reduction colours: 55 % wet, orange (7,5YR6/6), grey eggplant (5GY7/1) spots in dry, polyhedral subangular, clay medium, firm in wet, very hard in dry, moderate plastic, moderately adhesive, moderately compact, revival;

BtW 49-87 cm rust brown eggplant (7.5YR5/3) gray (5GY5/1) reduction colors 60% wet, dark orange (7.5YR5/6) eggplant spots (5GY7/1) dry, prismatic, medium clay, firm wet, hard dry, moderate plastic, moderately adhesive, moderately compact, jilav.

3.6. Vertosoil chromic, moderately stagnographed, on clays, medium clay/clay;

Ap 0-30 cm dark brown (10YR4/3) wet, greyish brown (10YR5/2) dry, angular polyhedral clay, medium clay clay, thin thick roots, frequent small pores, firm in wet state, hard in dry form, low plastic, low adhesive, low compact, dry, clear passage;

Byw 30-64 cm dark brown (10YR3/3) bluish spots (583/1) reduction spots 25% wet, dark grey brown (10YR4/2) greyish blue spots (586/1) dry, spheroidally large, well developed, medium clay clay, small point ferromangone spots, firm wet, hard dry, moderately plastic, moderately adhesive, weakly compact, revived, gradual transition;

BCyw 64-100 cm dark yellowish brown (10YR3/4) grey blue spots (583/1) reduction spots 25 % wet, yellowish brown (10YR5/4) light grey blue spots (586/1) dry, angular polyhedral, clayey, hard wet, very hard dry, moderate plastic, moderately adhesive, moderately compact, revival.

3.7. Pelosoil mesogleic (very strongly gleized), loamy-loamy/loamy-loamy, on very fine/fine fluvial deposits.

Ap(y):0-25 cm, clay clay, dark blackish brown, oblique faces, structure disturbed by tillage, polygonal cracks, firm, dry, net passage;

AByg2: 25-39 cm, clay clay, blackish, oblique faces, rare spots of eggplant and rust destroyed structure (the whole layer is a pasty mass – greasy and sticky), jilav-wet;

Byg4: 39-69 cm, clay clay, very dark gray brown, oblique faces with metallic luster, aubergine and rust spots, large prismatic-sphenoidal structure, moderately developed, firm, revival-jilav;

Bcyg4: 69-85 cm, clay clay, dark olive gray, oblique faces with metallic luster, eggplant and rust spots, frequent bovine, large, poorly developed, firm, jilav sphenoidal structure. Cyg4: 85-115 cm, dusty clay, yellowish eggplant with bovine, oblique sides with metallic luster, firm, jilav;

Cyg5: 115-165 cm, dusty clay, yellowish-eggplant with oblique faces and ferrimanganic accumulations, firm, jilav;

Cg5: 165-220 cm, medium clay, bluish-eggplant with ferrimanganic accumulations, friable, wet.

CONCLUSIONS

The territory is part of the eastern marginal area of the Crişurilor Plain, which insinuates itself along the depression corridor of the White Criş (Zărand-Ineu depression bay) and in the Cigher basin. This state boundary of the plain is sinuous and difficult to draw, due to the almost imperceptible interference between the plain and the completed deluvial trains (terraces and lower glaciers), belonging to the hilly area. The contact would take shape on the line of Mocrea-Moroda-Pancota localities. The bumps were mostly blurred due to antorpic activity.

In defining the current aspect, an important role was played by the hydroameliorative works carried out in the past, which led to the draining of swampy areas, meanders and abandoned arms. The network of sewers and drains is a regular element in the landscape. The impoundment of rivers produced an alluvialation of riverbeds. Currently, in the dammed bed of the Criş River there are processes of silting by alluvialization during floods and implicitly the elevation of the portion located between the dam and the minor bed itself.

The investigated area is therefore at the interference of air masses that have an oceanic character of western origin, which often arrive here with a higher degree of continentalization and continental ones, of eastern origin, but are frequently under the influence of warm air masses of southern origin that cross the Mediterranean Sea. According to Kopen's climate maps (1931), the investigated perimeter falls within the climate province of C.F.B.X., ie a temperate continental climate with oceanic and sub-Mediterranean influences.

From a geobotanical point of view, the researched territory falls within the forest-steppe zone. In the past, oak forests occupied significant areas, especially in the Crişului meadow. Currently, isolated specimens or smaller clumps of Salix sp. are found. Populus alba, Fraxinus excelsior, Robinia pseudoccacia, and among the shrubs: Prunus spinosa, Rosa cannina, Crataegus monogzna, Ligustrum vulgare.

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The limiting factors that graft on the soil cover are mainly represented by: acidity, low humus reserve, texture, high compactness (very low porosity), land slope and its unevenness, surface erosion (including erosion hazard), excess moisture (phreatic, surface, by overflows or runoff on slopes).

BIBLIOGRAPHY

DAVID, G., ŢĂRĂU, D., ŞANDOR, C. I, NIŢĂ, L., 2018 - Soil and climate factors that define land productivity in the lower plain of Banat. International Multidisciplinary Scientific GeoConference: SGEM; Sofia,Vol. 18, Iss. 3.2, (2018). DOI:10.5593/sgem2018/3.2/S13.061, p. 465;

DUMA COPCEA, A., MATEOC-SÎRB, N., MIHUŢ, C., NIŢĂ, L., MATEOC, T., NIŢĂ, S., SÎRBU, C., ŞTEF, R., SCEDEI, D., 2021 - Management of soil resources in Giarmata, Timiş county, Romania, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 21(1):253-257.

IANOȘ, GH., PUȘCĂ, I., GOIAN, M., 1997 - Banat soils - natural conditions and fertility (Solurile Banatului-condiţii naturale şi fertilitate), Mirton Publishing House, Timişoara, pp. 96-98.

IANOȘ, GH., BORZA, I., ȚĂRĂU, D., STERN, P., 1992 - Contribution of OSPA Timisoara to the soil research and increase of the fertility of agricultural lands from Banata (Contribuţia OSPA Timişoara la cercetarea solurilor şi sporirea fertilităţii terenurilor agricole din Banat), Soil Science no. 4, Bucharest, pp. 152.

MIHUȚ, C., NIȚĂ, L., 2018, Atmospheric factors used to characterize soil resources. Research Journal of Agricultural Science, 50(1), 2018, 143-146.

MIRCOV, V. D., OKROS, A, MIHUȚ, C., JERCIMOVICI, S., DUDAS, M., CIULCA, S., 2021, Interpretation And Analysis Of The Rainfall Regime In The Western Part Of The Country For Timis And Caras Severin In 2015-2019, Research Journal of Agricultural Science, 53, 142.

NIȚĂ, L., ȚĂRĂU, D., ROGOBETE, GH., DAVID, GH., DICU, D., NIȚĂ, S., 2018 - Using pedologic information in defining the quality and sustainable use of land in western Romania, 2018/1/1; Research Journal of Agricultural Science; Vol. 50, pp. 156-163.

NIȚĂ LUCIAN DUMITRU, LAȚO KAREL IAROSLAV, NIȚĂ SIMONA, LAȚO ALINA, MIHUȚ CASIANA, 2013, Quantitative and qualitative assessment of soil resources in Aranca plain, Research Journal of Agricultural Science, 45 (1), pag. 45

OKROS, A., PIRSAN, P., BORCEAN, A., MIHUT, C., NITA, S., MIRCOV, V.D., SHAHZOD, H., ABDUMANON, G., 2019 - Intensive Agriculture Management In The North-West Area Of The Banat Region Under The Influence Of Different Bio-Pedo-Climatic Conditions. Proceedings of the InternationaL Conference on Life Sciences. Proceedings Edition July, 2020, pp. 176-178.

O.S.P.A. Archive, Arad, 2020, 2021, 2022.

POSEA, GR., GRIGORE, M., POPESCU, N., IELENICZ, M., 1976 - Geomorphology (Geomorfologie), Didactic and Pedagogical Publishing House, Bucureşti, pp. 64-71.

RĂUȚĂ, C., 1995 - Sustainable agriculture in Romania. Soil Science, Series III, Vol. XXXI, no. 1, 1997, and vol. XXIX no. 1, 1995, p. 21.

ROGOBETE, GH., IANOS, GH., 2012 - Implementation of the Romania System of Taxonomy of the soild for the West part of Romania. (Implementarea Sistemului Român de Taxonomie a solurilor pentru partea de vest a României).

ȚĂRĂU, D., LUCA, M., 2002 - Panopticon of Banat communes fro pedological perspective (Panoptic al comunelor bănățene din perspectiva pedologică), Marineasa Publishing House, Timișoara, p. 181.

ȚĂRĂU, D., BORZA, I., ȚĂRĂU, I., RACOVICEAN, M., 2005 - Land resources from the South-west Romania. Defining elements of the sustainable development (Resursele funciare din sud-vestul României, elemente definitorii ale dezvoltării durabile), Scientific Papers. International Workshop, 21-22 Pct. 2005, p.18.

VRÎNCEANU, CALCIU I., 2000. - Monitoringul stării de calitate a solurilor din România (Atlas bilingv românenglez), Editura GNP, Bucureşti, ISBN 973-0-02137-6, 102 p.

http://www.frv.ro