

## THE SUITABILITY CLASSES AS ARABLE LAND OF SOILS FROM SOUTH – WESTERN ZONE OF DOLJ DISTRICT, THE TERRITORY OF PISCU VECHI AND GHIDICI LOCALITIES

*Popescu Cristian*

**Keywords:** soils, arable, suitability, texture, edaphic volume, fertility

### ABSTRACT

*The soils identified within Piscu Vechi and Ghidici communes from the South-Western part of Dolj District have been classified in four classes, namely, protisoils, chernisoils, cambisoils and hydric soils.*

*The less evolved soils from protisoil class, sandy soils and alluvial soils, with different subtypes and varieties are suitable as arable, they can be cropped with majority of plants after specific measures of reclamation. For these soils there have been established the suitability classes as arable IV, respectively III.*

*The chernisoils with different subtypes and varieties of chernozem have been classified in I<sup>st</sup>, II<sup>nd</sup> and III<sup>rd</sup> classes of suitability as arable, in function of formation and evolution specific, mainly due to parental material, the depth of the underground water and the alluvial process. All chernozem units can be used as arable, along with specific measures of improving their genetic fertility.*

*The eutricambosoils are less encountered in the studied area and the sandy eutricambosol that has been identified within this area belong to the II<sup>nd</sup> class of suitability as arable. It suits without restrictions for all crops; its fertility could be improved by balanced mineral fertilization and by irrigation.*

*The gley soils class, by its specific soil in this area, the molliccalcaric salsodic gley soil, belongs to the IV class of suitability as arable due to underground water at low depth and alkaline reaction. If they are not ameliorated, these soils have major restrictions for use as arable yet by applying hydric amelioration measures they can be cropped.*

### INTRODUCTION

Due to the fact that the Earth is limited as surface and the populace increases continuously, nowadays there is emphasized the rational use of land as source of raw materials and food by increasing the agricultural production by cropping the most productive and resistant crops and varieties in close relation with the knowing of soil features, the factors that act positively or negatively on them as well as the way the soil can be improved in order to be capable to give yields of good quality and quantity.

All these facts are imposed because the soil, as shallow layer of lithosphere that was transformed by the action of natural factors in characteristic conditions of geographical environment where it belongs is the natural environment of developing of plants roots giving water and nutrients for plants simultaneously and continuously.

This essential feature of soil – fertility has resulted from complex transformations underwent by the bedrock, by accumulation of substances and new features and processes that unfold within soil. The mineral substance of the soil is in a developed process of crushing, grinding, lulling and chemical transformation.

Apart from these transformations of the mineral materials, in comparison with the bedrock, the soil possesses a component of organic nature called humus which is a complex organic molecule with a high molecular mass as well as an immense microorganism population.

Beginning with these considerations, there was studied, in order to establish the suitability classes of soils for their usage as arable, the zone of Piscuvechi and Ghidici zone from the South-Western part of Dolj District.

## MATERIALS AND METHODS

The researches have been done according with the methods elaborated by the National Institute for Pedology, Agrochemistry and Environment Protection Bucharest, by field and laboratory studies.

By field researches there were established the main soil types and there were described their main morphological features.

By laboratory analyzes there were determined their main physical and chemical properties which were used in order to establish the suitability classes for using as arable of identified soils.

The soil units are grouped, as suitability, as field crops (arable) in classes, subclasses, groups and subgroups. For lands with very low suitability and extremely low there is specified the usage as orchards or vineyards, hay fields, pastures or woods. We emphasize the fact that this appreciation is a grouping or classification after their suitability yet not an alternative one and that the way they can be used for other purposes except the arable one is necessary a special study of the suitability degree for the chosen usage and a grouping in classes, subclasses, groups and subgroups of the land.

The grouping in the above categories is made according with the nature and the intensity of the restrictive factors for production. The restrictions can be given by the climate, soil, relief or drainage conditions. They refer both to the existent conditions as well as the danger of degradation they possess by exploitation. In both cases, from the restrictive conditions analysis there result the measures of amelioration. On the other hand, among ameliorative measures some can conduct the classification of a certain soil in a superior class and others are not modifiable, as climate, relief or edaphic volume.

Class I – terrains with very good suitability for field crops, without any restriction; they can be cropped without any amelioration measures of prevention of degradation; they give very good yields.

Class II – terrains with good suitability, with reduced limitations; the danger of soil degradation or deficiencies can be improved by current cropping technologies or ameliorative measures that can be applied by farmers (they give good yields);

Class III – terrains with average suitability, with moderate limitations that reduce the array of crops and need measures of amelioration by funding (average yields in not ameliorated conditions);

Class IV – low suitability (marginal) terrains, with severe limitations that determine appreciable diminish of yield; in order to ensure good yields they must be ameliorated.

Class V – terrains with very severe limitations that are not suitable when they are not ameliorated nor for field crops nor for orchards or vineyards; in order to be cropped they need special measures of reclamation that are complex and intensive; by improvement they can be used as follows:

VA – they can be classified in a superior class of suitability for arable (or other usage whether the climate conditions are favorable);

VL – they can be used as orchards (whether the climate conditions are favorable);

VV – they can be used for vineyards (whether the climate conditions are favorable).

Class VI – terrains with extremely severe limitations which can not be used for field crops or orchards and vineyards by reclamation measures; they can be divided as follows:

VI F – terrains that can be used as hay fields (including woods and pastures);

VI P – terrains that can only be used as pastures;

VI S – terrains that can only be used as woods;

VI N – terrains that can not be used for any agricultural or forestry purposes.

The suitability classes are divided in subclasses and groups in function of the nature and, respectively, the intensity of restrictive factors. The subclass is determined by the nature of limitation or associated limitations and the group is a division of subclass determined by the intensity of associate limitation or the limitation of the class. The subclass is noted with symbols (uppercase) for each limitative factor (V= volume; Q= underground waterlogging, etc). for group notation there are added arab figures from 2 to 6 at the symbols of the limitative factors, the respective figures signifying the intensity of the restrictive factor of the classes, from 2 to 6 ( 1 is not used because it means optimum).

The suitability of subgroups belongs are seen as division in function of the soil characteristics that influences the choosing of amelioration measures and the technologies of crops (the texture, the salinisation degree, the alkalisation degree, the thickness of soil till the bedrock, the humus pool, coverage by reed, shrubs, anthill).

There has to be stated that the element taken in account at the establishing the groups are divisor at the class level, one element being found with the same value to many terrain groups. This way, the thickness of the soil or the humus pool can have the same value at terrains from class I cu chernozems and terrains from IV class with waterlogged soils.

The notation of subgroups is made with symbols formed of small caps letter for the nature of features and with figures for the interval of value of them.

## RESEARCH RESULTS

In Piscu Vechi and Ghidici localities from South-Western zone of Dolj District the suitability classes as agricultural land are the following (figure 1. The cartogram of suitability classes):

1. The protisoils class:

- eutric sandy soil -  $IV_{ps} - N_4 - U_3 - n$
- mollic psamosoil -  $III_{ps} - U_3N_2 - nl$
- calcaric, gleyc alluvial soil -  $III_{as} - Q_3N_2 - nl$
- mollic, calcaric, gleycalluvial soil -  $III_{as} - Q_3C_2 - I - la$
- calcaric, gleyc, salsodicalluvial soil -  $III_{as} - Q_3S_2A_2N_2 - nl$

2. Chernisoiil class:

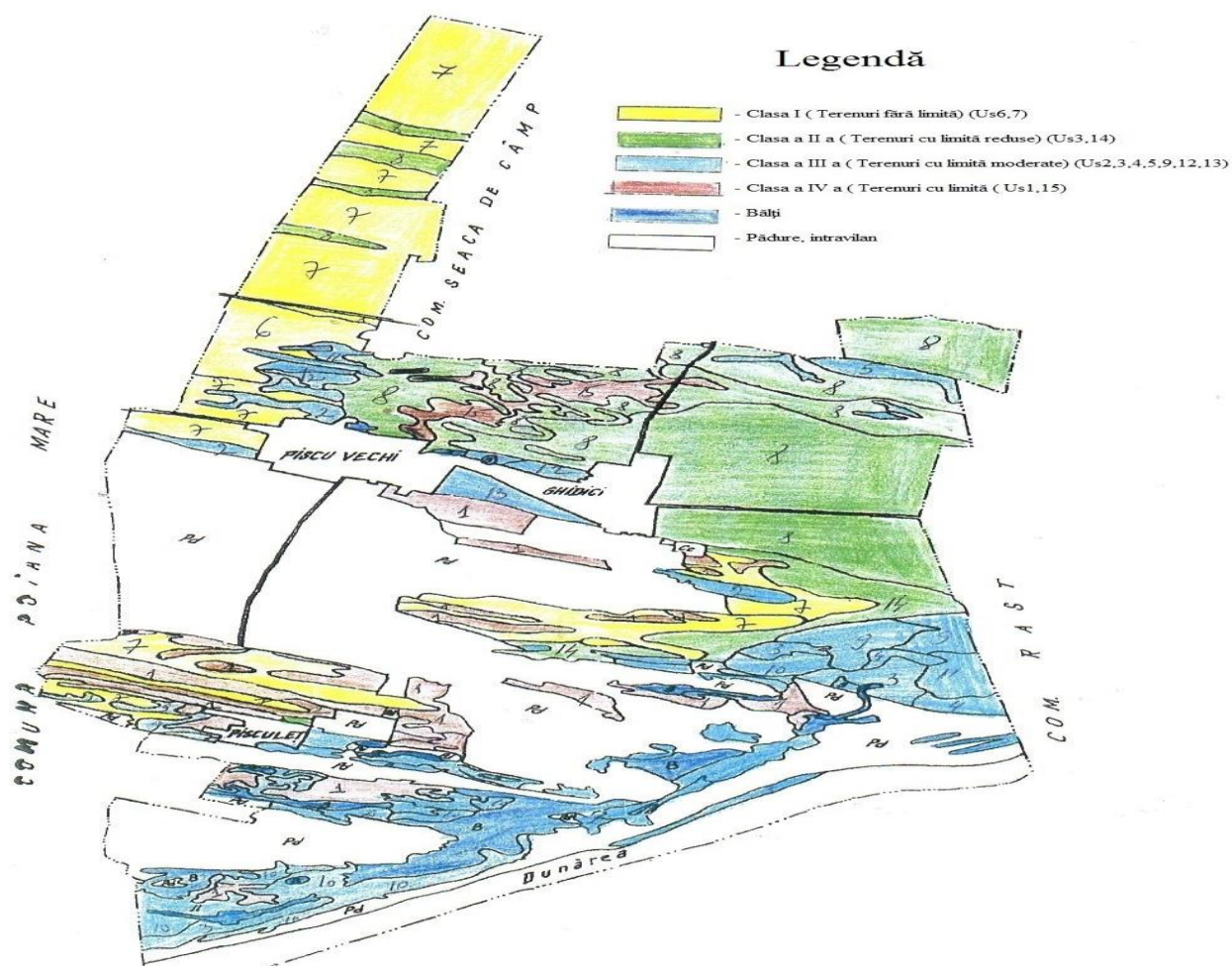
- typical chernozem -  $I_{cz} - ln$
- calcaricchernozem -  $I_{cz} - ln$
- calcaric, salsodicchernozem -  $II_{cz} - S_2A_2 - ln - l$
- calcaric, gleycchernozem -  $III_{cz} - Q_3S_2A_2 - I - la$
- gleyc, alluvicchernozem -  $III_{cz} - Q_3N_2 - nl$
- gleyc, alluvic, salinic, calcaricchernozem -  $III_{cz} - Q_3S_2A_2 - l$
- salsodicgleycchernozem -  $III_{cz} - Q_3S_2A_2 - ln$
- gleyc, calcaric, salinicchernozem -  $III_{cz} - Q_3S_2A_2 - l$

3. Cambisoiil class:

- psamic eutricambosoiil -  $II_{ec} - N_2U_2 - nl$

4. Hidrysoil class:

- mollic, calcaric, salsodic gleyosoiil -  $IV_{gs} - G_4Q_4S_3A_3C_2$



**Fig.1. The cartogram of suitability classes for arable of soils from Piscu Vechi and Ghidici communes, District Dolj**

Class I comprises terrains without any limitations when used as arable land and they are soils with the texture of the surface horizon formed of sandy loam or loam, with high edaphic volume, not salty or salty in the depth – very good soils.

Class II includes terrains with reduced limitations when used as arable land and they are soil with loam or sandy loam texture of the surface horizon, with average edaphic volume – good soils.

Class III has terrains with moderate limitations when used as arable and they are soils with the texture of the surface horizon formed of middle sand, fine sand or clay, with little edaphic volume, low salinized – average soils.

Class IV comprises terrains with severe limitations when used as arable and they are soils with the texture of the surface layer formed of thick sand, with low edaphic volume, moderated salized – poor soils.

### CONCLUSIONS

The soils that belong to the protisoil class can be cropped without any restriction as arable land and they are favorable for most crops if irrigation is done, manure is applied as well as fertilizers in balanced and frequently doses. There are beneficial the works for lowering the water table for alluvial soils and wind protection woody strips planted by acacia on sandy soils. These works must be continued in the future in order to maintain this class of soil as arable land.

For chernisoil class there are recommended, as ameliorative works, the completion of the nutrient reserve by applying high quantities of manure and diversified fertilizer types,

deep tillage, irrigation for ensuring the water requirement. After applying these measures the soils from this class can be used as arable without any restriction.

The cambisol class soils can be used without any restriction as arable land for all crops yet for enriching the fertility potential there are recommended the applying of manure in small and frequent rates and irrigation with small norms yet frequent.

As regard hydri soils, for enriching their fertility and the productive potential first there is recommended the lowering of the water table at a not critical level that allow a good permeability and warming of soil as well as a balanced fertilization. This way, these soils can be used as arable for crops.

### BIBLIOGRAPHY

1. **Bălan Mihaela**, 2010, *The soil losses by erosion in Preajba zone, District Gorj, under the influence of climate, human activity and vegetation, Analele Universitatii din Craiova, seria Agricultura – Montanologie – Cadastru Vol. XL/1 2010, ISSN 1841-8317, PAG 294 – 297.*
2. **Burtea Mihaela**, 2007, *Current status of soil degradation through the erosion process”, Simpozion omagial “60 ani de invatamant superior agronomic in Oltenia”, vol. XXXVII/B, Analele Universitatii din Craiova, pag. 111 – 115, ISSN 1841-8317;*
3. **Constantinescu Emilia**, 2005, *The influence of the nutrition space upon the production of inflorescences at Calendula officinalis L, cultivated on the ashes from Thermo –electric power station in Craiova. Scientific papers, Agronomy series, vol. XLVIII, U.S.A.M.V. Iași, pgs. 429 - 432, 2005.*
4. **Florea N., Munteanu I.**, 2012, *Sistemul Român de taxonomie a Solurilor, Editura Sitech, Craiova.*
5. **Osiceanu M., Ionescu I.**, 2008. *Researches concerning the N:P:K report of the temporary meadows of the Oltenia hill region. În Lucr. șt. Univ. Agonom. și de Med. Vet. Cluj Napoca, vol. 65 (1).*
6. **Popescu Cristian**, 2016, *The cropping characterization of soils from Vladaia locality, district Mehedinți, Analele Universitatii din Craiova, Agricultura, Montanologie, Cadastru, vol. XLVI /1 ,pag 364-371, ISSN 1841-8317, ISBN CD-ROM 2066-950X.*
7. **Savescu P., Poenaru M.M., Iacobescu F.**, 2016, *Study regarding the development of organic farming systems in Romania as the basis for obtaining of innocuity agricultural raw materials – used in functional food, Annals of the University of Craiova, Series Agriculture, Montanology, Cadastre, Romania, vol. 46/issue 1, pp 281-285.*
8. \*\*\* 1987, *Metodologia elaborării studiilor pedologice, ICPAPM, București.*