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SOIL PRODUCTION CAPACITY FROM PESAC, TIMIŞ COUNTY FOR DIFFERENT CROPS AND AGRICULTURAL USE

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Abstract

For soil production capacity appreciation of agricultural fields from Pesac, Timiş County we selected from the entire weather conditions a number of 17 more significant indicators that can be precisely determined. Relying on these indicators and on the scales we extracted from tables, annexes 3 – 1 to 3 – 18, (in conformity with the elaboration methodology of soil studies, second part) hierarchy coefficients that express de favorability degree of an indicator for every crop and usage category of agricultural field. Agricultural production, especially the plant directly influenced by environmental factors and conditions, which are in constant stability, and different degrees of relation to human intent and decision to change it, is a decisive factor in the economic development of society.
Naturally, every manifestation of climate characteristics is determined by the geographical location of the place looked, especially in terms of latitude. These two factors determine, along with the exhibition, the ratio of land area to sun and heat reception mode by default, and to a large extent and manifestation rainfall.

Key words: *capacity, physical and chemical feature, soil*

INTRODUCTION

Being an area with a good drainage we find chernozem soils that are specific to the north–west area.[2]We can separate this type of soil in many subtypes, and the dominant subtype is the wet water table chernozem. [4] Due to the physic, chemical and biological proprieties these types of soils have a higher natural fertility. [1] On this type of soil we have good cereal, technical plants and fodder cultures.[3] In depression areas we have gley-soils that appear due to the risen water table rich in potassium.[6]
Land evaluation under natural conditions is a complex operation knowledge of the natural resources for growth and fruiting plants and determines the suitability of the conditions imposed for each use and culture in part, through a system of indices of evaluation techniques and notes.[7]

MATERIALS AND METHODS

Assessing agricultural lands is a complex operation aiming at the deep knowledge of the plants' growth and development conditions and at determining the suitability degree of these conditions for each use and crop (given that a land can be suitable for certain uses and crops, but unsuitable for others) through a system of technical indices and land assessment grades. As such, land assessment determines how much better a land is compared to other ones taking into account its fertility as shown by the vegetal production.
The object of land assessment is land that is to be divided so that each area taken into account is as homogeneous as possible from the point of view of all environmental conditions and vegetation factors. These land parcels are called land units (LU) or homogeneous ecological lands (HEL), and they represent the basic units of the land with their specific features, distinct from the neighbouring areas.
For the calculus of land assessment grades we have chosen, from the multitude of environmental conditions, only those that characterise each land unit in our soil study, the most important ones for us, the easiest and the most accurate to measure, and the ones

that are usually mentioned in literature (e.g., those that are mentioned in the research carried out by the OSPA – Timis starting with 1976); these land assessment indices are: index 3. C – mean annual temperatures – corrected values; index 4. C – mean annual rainfalls – corrected values; index 14. – gleysation; index 15. – pseudo-gleysation; index 16 or 17 – salinisation or alkalinisation; index 23. A – texture of Ap in the first 20 cm; index 29 – pollution; index 33 – slope; index 38 – land gliding; index 39 – depth of water table; index 40 – liability to inundation; index 44 – total porosity in the restrictive horizon; index 61 – contents of total $CaCO_3$ within 0-50 cm; index 63 – Ap reaction in the first 20 cm; index 69 – base saturation level in the Ap or within 0-20 cm; index 133 – edaphic volume; index 144 – humus supply within 0-50 cm; index 181 – stagnant (surface) moisture excess.

In land assessment for natural conditions, each of these indices – except for index 69, which cooperates indirectly – contributes to the land assessment grade through a land assessment coefficient ranging between 0 and 1, depending on the feature (totally unsuitable or optimal) for the use of crop taken into account).

For each index, depending on its scale of use or crop, we designed tables containing their values.

RESULTS AND DISCUSSIONS

Table 1. Soil favorability from Pesac, Timis County for wheat, barley, corn and sun flower crops

Nr.	Soil type	Wheat		Barley		Corn		Sun Flower	
		HN	DF	HN	DF	HN	DF	HN	DF
1	Chernozem	90	II	90	II	90	II	90	II
2	Typical chernozem	80	III	80	III	80	III	80	III
3	Black gley-soil	46	VI	46	VI	45	VI	48	VI
4	Typical gley-soil	39	VII	43	VI	44	VI	48	VI

*HN = hierarchy note
*DF = degree of fertilization

From the hierarchy notes analysis for the straw-like crops (autumn wheat and barley) we can observe an accentuated difference of the soil units in what concerns the conditions that are created for the plants. The biggest notes are obtained by the typical chernozem with a degree of fertilization of II, respectively III.

Table 2. Soil favorability from Pesac, Timis Couny for potatoes and beet crops

Nr.	Soil type	Potatoes		Beet	
		HN	DF	HN	DF
1	Chernozem	90	II	90	II
2	Typical chernozem	90	II	90	II
3	Black gley-soil	53	V	46	VI
4	Typical gley-soil	53	V	58	V

*HN = hierarchy note
*DF = degree of fertilization

For the potato and sugar beet crops we obtained high values in chernozems and lower values in gley-soils.

The low values of gley-soils are explained by the exigency that these crops manifest towards the climate conditions and the physical and chemical proprieties in which the root system develops and from where the main production is obtained – roots and tubers.

Table 3. Soil favorability from Pesac, Timis County for linseed oil, flax bundle and hemp crops

Nr.	Soil type	Linseed oil		Flax bundle		Hemp	
		HN	DF	HN	DF	HN	DF
1	Chernozem	90	II	90	II	90	II
2	Typical chernozem	70	IV	70	IV	70	IV
3	Black gley-soil	46	VI	33	VII	39	VII
4	Typical gley-soil	46	VI	33	VII	33	VII

*HN = hierarchy notes
*DF = degree of fertilization

Linseed oil, flax bundle and hemp find less favorable conditions in black gley-soil and typical gley-soil.

Table 4. Soil favorability from Pesac, Timis County for pastures and hay-fields

Nr.	Soil type	Pastures		Hay-fields	
		HN	DF	HN	DF
1	Chernozem	90	II	90	II
2	Typical chernozem	80	III	80	III
3	Black gley-soil	65	IV	56	V
4	Typical gley-soil	47	VI	41	VI

*HN = hierarchy notes
*DF = degree of fertilization

Hay-fields manifest an exigency towards the physical and chemical proprieties of the selected soils which leads to the drop of hierarchy notes at the following soils: black gley-soil and typical gley-soil.

Table 5. Soil favorability from Pesac, Timis County for apple, pear and plum trees

Nr.	Soil type	Apple tree		Pear tree		Plum tree	
		HN	DF	HN	DF	HN	DF
1	Chernozem	80	III	70	IV	90	II
2	Typical chernozem	80	III	80	III	90	II
3	Black gley-soil	14	IX	14	IX	14	IX
4	Typical gley-soil	12	IX	12	IX	12	IX

*HN = hierarchy notes
*DF = degree of fertilization

The trees present an exigency especially regarding the gleizare and alkalization processes. The presence of small depth mineralized water table expels the placement of apple, pear and plum cultures on black gley-soil and typical gley-soil.

Table 6. Soil favorability from Pesac, Timis County for grape vine and table vine

Nr.	Soil type	Grape vine		Table vine	
		HN	DF	HN	DF
1	Chernozem	90	II	90	II
2	Typical chernozem	80	III	80	III
3	Black gley-soil	17	IX	17	IX
4	Typical gley-soil	18	IX	21	VIII

*HN = hierarchy notes
*DF = degree of fertilization

Unfavorable or less favorable conditions for these soils are given by the following types of soils: black gley-soil and typical gley-soil.

Table .7 Soil favorability from Pesac, Timis County for vegetables

Nr.	Soil type	Vegetables	
		HN	DF
1	Chernozem	90	II
2	Typical chernozem	80	III
3	Black gley-soil	14	IX
4	Typical gley-soil	12	IX

*HN = hierarchy notes
*DF = degree of fertilization

Vegetables can be easily cultivated on soils with a secure water source for irrigation purposes and a series of other favorable elements.

Favorable conditions are given by the following types of soils:

-Chernozem with a score of 90 and a fertility degree of II;

-Typical chernozem with a score of 80 and a fertility degree of III.

Unfavorable conditions for this type of crop due to short horizons, erosion and surface calcium carbonate are given by the following types of soils:

-Black gley-soil and typical gley-soil have bonus notes which are framed in the IX fertility degree.

CONCLUSIONS

Chernozems are soils that have the best physical and chemical proprieties, and that is why they have a high production potential.

Chernozems are good for every type of crop.

We obtained good results in: wheat, barley, corn, beet, sun flower and potatoes.

Good results are obtained in vine and fruit trees.

To grow chernozem fertility it is recommended:

-Agro-technical works that will lead to accumulation and maintenance of water in the soil;

-Periodic appliance of organic fertilizers and moderate fertilization with NPK;

-Monoculture avoidance and rigorous appliance of a crop rotation;

-Completion of the humidity deficit through irrigations in case of sugar beet, corn etc.;

-On the gley-soils, due to the periodical oscillations of the water table that influences negatively the physical and chemical parameters and the fertility, the crops hardly bear the lack and the excess of humidity.

The gley-soils that developed on more permeable rocks that have a better drainage are more productive, being covered with pastures or medium quality forests.

After amelioration we can cultivate: wheat, corn, barley, sun flower.

Gley-soils are not recommended for vine or fruit trees cultivation.

For the fertility growth of the gley-soils it is recommended:
-Organic and mineral fertilization;
-Application of calcareous amendments.

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