CROP SUITABILITY ANALYSIS AND EASTERN CRAIOVA MAIN SOILS PRODUCTIVITY CAPACITY, CIRCEA AREA

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ABSTRACT

The analysis on fertility, crop suitability for different plants and eastern Craiova soils productivity capacity, i.e. Circea village area, was carried out by estimation work under natural conditions, a complex specialized work which highlights natural conditions of the area, where the soils and their physicochemical properties emerged and developed.

Due to a varied natural conditions range, mainly because of the landscape, a large variety of soils, such as the reddish preluvosoil have formed in the area where the research was carried out; out of which, on wider areas, reddish luvic preluvosoil, reddish eroded and stagnic preluvosoil and reddish alluvial preluvosoil.

As a result of land evaluation and crop favourability classes, depending on natural factors and soil properties in the researched area, one can note that the alluvial reddish preluvosoil is characterized by the highest natural fertility, being followed by the luvic red preluvosoil. Reddish stagnic preluvosoil is characterized by a very low natural productivity potential, highly differentiating itself from the other three types of soil. The highest productivity is that of the reddish alluvial preluvosoil followed closely by that of the reddish luvic preluvosoil, and the lowest productivity is that of the reddish eroded and stagnic preluvosoils; that of soils on slopes, where the lowering or limiting factors of productive capacity are represented by the processes of erosion and stagnogleyzation.

INTRODUCTION

Soil evaluation is a type ofspecialized work that is carried out after the work of soil identification in the field has been undertaken; this work's purpose is to establish one soil or land's relative value, and also the most suitable crops and uses, i.e. the most productive ones. Based on this soil assessment action, one can estimate the yields that can be obtained from working that land, due to that particular type of soil, for a particular crop plant. After having carried out these estimations, the technologies that are to be used are chosen, the improvements and investments that can be made, the level of labour remuneration, etc.

Suitability assessment for different cultures and moreover the estimation of production capacity whenever we take into account soils or lands can be achieved under natural conditions of use or under men'sconditions of intervention as a result of various improvement works.

In the reference area, in order to achieve the targets set, the evaluation work under natural conditions was performed, consideringnatural factors and soil properties as evaluation markers which have an essential influence upon plant growth and bearing fruit, as follows: average annual temperature; average annual properties; gleization; salinization or alkalization; Ap texture in the first 20

cm; soil pollution status; landslides; groundwater deepening; floodable soils; total porosity in the first horizon; CaCO3 content in the first 50 cm; pH value in the first horizon; soil edificial properties; humus reserve in the first 50 cm; surface moisture excess.

MATERIALS AND METHODS

In order to carry out soil evaluation work, in the east of Craiova, Carcea area, that area's mapping was carried out which helped at the identification of that area's soil units, with the help of soil profiles placed on different landscape forms. Soil samples were collected which were afterwardsanalysed from a physical and chemical point of view. Based on field data and laboratory analysis results, four soil types specific to those naturalconditions of the area were identified.

For the evaluation carried out under natural conditions of the identified soils, values of evaluation coefficients ranging from 0 to 1 were needed; they are specific to natural factors and soil properties.

Based on these evaluation coefficients, naturalevaluation marks were establishedfor not only for all the plants under study but also for all the four soil types of the area under study. The value of natural evaluation mark may range from 0 to 100 points.

Based on the value of the evaluation marks,soil favourability classes for different plants were established. In the case of natural evaluation, there are ten favourability classes: Class I = 100-91, Class II = 90-81, Class III = 80-71, Class IV = 70-61, Class V = 60-51, Class VI = 50-41, Class VII = 40-31, Class VIII = 30-21, Class IX = 20-11, Class X = 10-1 points,

When the evaluation mark is 0, it is not recommended to grow and cultivate the plant because it has as its result a low, economically inefficient productivity.

In order to estimate soil productivity capacity in the studied area the equivalent in kilograms per harvesting hectare characteristic to one evaluation point was the unit of measurement and by multiplying the evaluation markwith the quantity of products in kg per point of the natural evaluation mark for each plant under study, yields in kg / ha were sort out, which can be obtained per hectare, for each soil unit and by each crop plant.

RESEARCH RESULTS

Table 1 is an illustration of evaluation marks and favourability classesfor each of the four types of soils, taking into account only the natural conditions in which they formed and their properties.

Analysing the results obtained, it was found that the alluvial reddish preluvosoil got high quality marks and good favourability classes for most of the plants, which highlight this soil's natural productive potential. Best favourability for this soil is that of the apricot, cherry, sourcherry trees, vines, which scored 80 points, while potato is the least suitable, scoring barely 52 points.

Reddish luvic preluvosoil is characterized by medium suitability; most plants scored around 60 points. Best to be cultivated on this type of soil are the plum, cherry, sourcherry, apricot and peach trees as well as vine. After the yields of vineyards and trees the ones most favourable to follow are those of cereal plants, which fall in the fifthfavourability class; they all scored 58 points. The poorest results were scored by grasslands, i.e. 50 point; meaning sixth favourability class.

Asexpected, reddish eroded preluvosoilis characterized by a very low natural fertility since it is a type of soil that

is to be found on moderate slopes, where slow geological erosion has gradually but permanently removed the surface clayed horizon, this being the reason and cause for which the soil is poor in humus and nutrients. All the plants which have been cultivated on this type of soil have scored poor evaluation marks, i.e.less than 50 points; the only exception is that of the apricot trees which scored 58 points.

Table 1

Evaluation marks and favourability classes scored by main soils in the eastern part of Craiova, Circea area, for natural conditions

Use or crop plant	Reddish luvic preluvosoil		Reddish eroded preluvosoil		Reddish eroded and stagnic preluvosoil		Reddish alluvial preluvosoil	
		Favourability class	Generalscore / points	Favourability class	otal points	Favourability class	General score / points	Favourability class
Pastures		General score / points	50	IV	0	VII	64	IV
Grasslands		64	35	VII	7	VII	50	VI
Apple Tree		50	37	VII	9	VIII	64	IV
Pear Tree		58	37	VII	4	VIII	72	III
Plum Tree		65	46	VI	7	VII	72	III
Cherry-sour cherry Trees		72	47	VI	3	VII	80	III
Apricot Tree		72	58	V	1	VIII	80	III
Peach Tree		72	47	VI	1	IX	80	III
Vine -wine		72	47	VI	7	VII	80	III
Table vine		72	41	VI	1	VIII	65	IV
Wheat		72	47	VI	8	VIII	65	IV
Barley		58	47	VI	8	VIII	65	IV
Corn		58	37	VII	7	IX	65	IV
Sunflower	58	58	41	VI	3	IX	65	IV
Potato	58	V	20	IX		X	52	V
Alfalfa	73	II	47	VI	9	VIII	72	III
Vegetables	52	V	32	VIII	2	IX	58	V

Reddish eroded and stagnic preluvosoil is also characterized by a very low natural fertility, since it is a type of soil which is characteristic to shaded northern slopes and in addition to the erosion process there is also that of rainwater stagnation. Most plants scored less than 30 points, which means very low favourability classes, i.e. VIII, IX, X. Higher scoring was achieved by pastures which got 40 points and vine wine which reached 37 points and the lowest score

was recorded by potato i.e. 5 points as evaluation mark and tenthfavourability class.

Table 2 illustrates productivity capacity for each of the four soils that are

to be found in the eastern part of Craiova, the area of Circea, taking into consideration only the natural conditions in which they formed and their properties.

Table 2

Productivity capacity for the main soils in the eastern part of Craiova, Circea area, for natural conditions

Use or crop plant	Reddish luvic preluvosoil		Reddish eroded preluvosoil		Reddish eroded and stagnic preluvosoil		Reddish alluvial preluvosoil	
	General score / points	Favour ability class	General score / points	Favour ability class	General score / points	Favour ability class	Gener al score / points	Favourability class
Pastures	64	12800	50	10000	40	2400	64	12800
Grasslands	50	10000	35	1750	27	1350	50	10000
Apple Tree	58	17400	37	11100	29	8700	64	19200
Pear Tree	65	19500	37	11100	24	7200	72	19200
Plum Tree	72	18000	46	11500	37	9250	72	18000
Cherry-sour cherry Trees	72	7200	47	4700	33	3300	80	8000
Apricot Tree	72	10800	58	8700	21	3150	80	12000
Peach Tree	72	10800	47	7050	11	3150	80	12000
Vine - wine	72	10800	47	7050	37	5550	80	12000
Table Vine	72	12240	41	6970	21	3570	65	11050
Wheat	58	3480	47	2820	28	1680	65	3900
Barley	58	3480	47	2820	28	1680	65	3900
Corn	58	4640	37	2960	17	4680	65	5200
Sunflower	58	1856	41	1312	13	416	65	1495
Potato	58	26100	20	9000	5	1500	52	15600
Alfalfa	73	5840	47	3760	29	2320	72	5760
Vegetables	52	15600	32	9600	12	3600	58	17400

It can be also noticedthe fact that the most productive capacity is that of reddish alluvial preluvosoil, extremely closelyfollowed by reddish luvic preluvosoil, which are responsible forgreat productivity capacity at most of the plants studied. Highest yields can be

obtained on these types of soils when we refer to fruit tree planting and vineyards, but cereal grains yields can be characterized by good productivity capacity also.

At the opposite end of the spectrum arethesoils on the slopes,

i.e.reddish eroded preluvosoil and reddish eroded and stagnic preluvosoil, whereyields are lower for all studied plants. The factors that play a main role in decreasing or limiting productivity capacity are erosion and stagnogleization processes. Lowest yields on these soils have been estimated for cereal grains and potato.

Sinceyieldestimation is made per soil unit based on the evaluation marks under natural conditions achieved by that particular soiland with the help of productivity foreach point of the evaluation mark for each individual plant it is absolutely logical and normal, that the agro-productive potential to be very well correlated with evaluation marks and also, of course, with favourability classes.

CONCLUSIONS

Soil evaluation work in the in the researched area was carried out by taking into consideration only the plants that are currently cultivated in the area, namely: pastures, grasslands, apple, pear, plum, cherry-sour cherry, apricot, peach trees, vine-wine, table vine wheat, barley, corn, sunflower, potato, alfalfa, vegetables.

After having set evaluation marks and favourability classes, depending on natural factors and soil properties in the researched area, it was noted the fact that the reddish alluvial preluvosoilis characterized by the highest natural fertility, followed by the reddish slightly luvic preluvosoil. Reddish eroded preluvosoil that is to be found on the southern slopes, falls into middle-to-low fertility classsince the plants under study fall in the sixth and seventh favourability classes.

Reddish eroded and stagnogleizedpreluvosoil is characterized by a very low natural productivity capacity, greatly differentiating itself from the other three types of soil. All the plants

under study meet poor developmental conditions on reddish eroded and stagnic preluvosoil that is to be found on the northern slopes, well-shaded. Most plants scored less than 30 points, which means very low favourability classes, i.e. VIII, IX, X.

The data obtained after soil evaluation work has been carried out reflect reality, namely productivity capacity for each type of soil and the possibilities to improve them. Also, it was noted the fact that soils characterized by a higher productivity potential, such as the reddish alluvial preluvosoils, improvement actions that are to be performed in order to obtain great and safe yields, are fewer and are not characterized by such an intensive degree. On the soils characterized bylow natural productivity capacity, such as reddish eroded and stagnic preluvosoils, the ameliorative measures which are to be applied in order to increase agricultural productivity are more numerous and more radical, too.

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