THE SUITABILITY OF SOILS IN THE AREA OF THE COMMUNE DIOSTI, DOLJ COUNTY, FOR DIFFERENT CROPS AND, IN PARTICULAR, FOR HORTICULTURAL PLANTS

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ABSTRACT

The importance of the soil evaluation work consists in that the evaluation marks establish the uses and cultures most indicated on a certain field. The evaluation marks are variable and depend on the characteristics of the soil, the crop varieties and hybrids used, the technologies applied, etc. From the analysis of the physical, hydro-physical and chemical properties of the soils in Diosti commune, Dolj County, and their distribution by modes of use, it is found that the largest surface is suitable for arable use; the horticultural plants are suitable on a smaller surface. The productions obtained during the period when the observations were made (2015-2018) at the main horticultural plants are average or tend towards the upper part of the production recommended by the technology. In 2018, with apple tree, a production of 12.5 t / ha was obtained. In 2016 and 2017, the production was 11 t / ha. The average over the 4 years was 10.7 t / ha. The plum tree yields were between 5.5 - 7.0 t / ha. These obtained productions are due to the culture system with large distances between trees and the climatic conditions in the area but also to other factors such as not applying the phytosanitary treatments in time.

INTRODUCTION

Land evaluation is a complex research and qualitative assessment of the main conditions that determine the growth conditions and development of plants and establishing the degree of favorability of these conditions for each mode of use and cultivation and, finally, it identifies soil types in the researched area. Concerns regarding the appreciation of the agricultural soils of our country after their fertility, have been encountered since the middle of the last century. Currently, the evaluation of agricultural land in our country is done on the basis of the system developed by D. Teaci. This method uses the evaluation marks in order to express the favorability of agricultural land for different types of use and crop plants. This method is based on two distinct sides, namely: the actual evaluation and the technological characterization of agricultural lands. Natural factors and soil characteristics are used to determine the evaluation marks: soil relief, climate, hydrology, texture, gleysation, useful edaphic volume, total porosity, soil reaction, humus reserve, etc. Depending on the general score of the evaluation obtained by multiplying by 100 the product of the values of the coefficients of the considered indicators, the evaluation or favorability classes are obtained.

MATERIAL AND METHOD

In order to establish the suitability of the soils of the commune of Diosti for different cultures, the work of evaluation under natural conditions was performed, based on the system elaborated by D. Teaci. The indicators used to characterize the natural conditions and properties of the soils, are evaluated by means of coefficients of evaluation that have values between 0 and 1. The marks of evaluations per uses are obtained by multiplying the values of the coefficients, the indicators of evaluation under natural conditions, and the result is multiplied by 100. Depending on the general score of evaluation obtained by multiplying by 100 the product of the values of the

coefficients of the considered indicators, 10 classes of evaluation or favorability have been established, namely. Class I, from 100 to 91 points, class X a, from 11 to 1 points. In order to establish the suitability of the soils from the commune of Diosti, Dolj County, for the horticultural plants, observations were made, on the main horticultural plants in the studied territory, apple tree, plum tree, vine, regarding the obtained productions, and based on laboratory analyzes, the results regarding the content of fruits and grapes in dry matter, sugar and total acidity were interpreted.

RESULTS AND DISCUSSIONS

The importance of the paper work consists in that by the respective score, the most indicated uses and cultures are established on a certain field, the paper works serve to substantiate the investments, the remuneration of the work in agriculture, the establishment of the technologies, etc. The evaluation marks are variable depending on the characteristics of the soil, the soils and hybrids used, the technologies applied, etc. From the data entered in fig.1., it can be seen the distribution of soils in the commune of Diosti, Dolj County, by modes of use. The largest surface, is suitable for arable use, the horticultural plants are suitable on a smaller surface. From table 1., it appears that the clayey chernozem obtained the highest evaluation marks. It is the soil with the highest productive potential among the soils identified in the commune of Diosti, it is the favorable environment for most cultures. The highest evaluation marks were obtained for apple tree, plum tree, pear tree, vines, cherries, sour cherries, apricots, peaches, as well as the other cereals (wheat, barley, corn, sunflower). Cultures fall into the favorability classes I, II and III. On the gleyc phreatic cambic chernozem, which has a production potential close to that of the clayey chernozem, the crops fall into the favorability class II and III, except for pastures, meadows, alfalfa and clover. The reddish preluvosoil obtained evaluation marks close to those of the gleyc chernozem, the highest marks were obtained at the horticultural plants: cherry, sour cherry, apricot, peach, vines, vegetables. The crops fall into the favorability classes III and IV, with the exception of pastures, clover and potato.
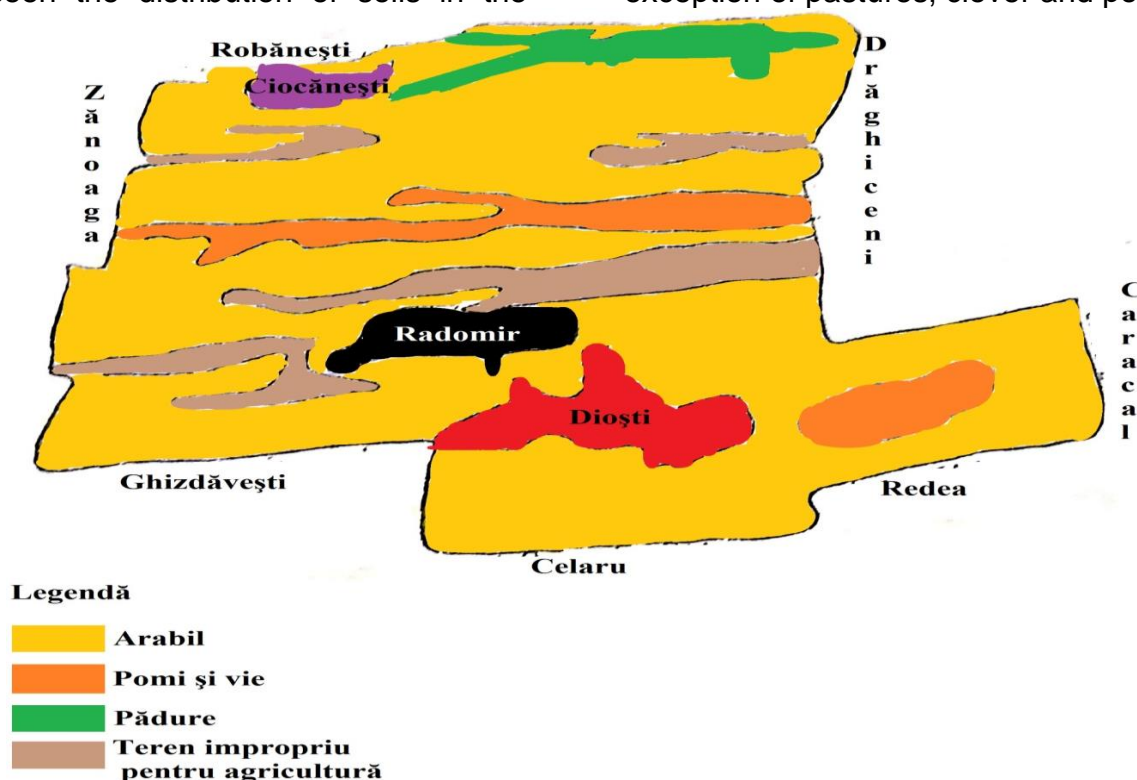

Figure 1. The map of soils suitability.

Analyzing the production results obtained in the period 2015-2018, during which the observations were made, on an area of 7 ha apple tree, 10 ha plum tree and 4 ha vines (wine varieties), it is found that they are average, or tend towards the upper part of the recommended production of technology (table 2.). It is noted that in 2018, at the apple yield was 12.5 t / ha. In 2016 and 2017, the production was 11 t / ha. The average over the 4 years was 10.7 t / ha. The plum yields were between 5.5-7.0 t / ha. These obtained productions are due to the culture system with large distances between trees and the climatic conditions in the area. Analyzing these productions, it is found that they are not so good in comparison with the productive potential of the soil, considering that the obtained production is due to the ones mentioned above (culture and climate system) but also to other factors such as: failure to apply in time treatments against diseases and pests.

Table 1.

The evaluation marks and the suitability classes of soils from Diosti commune, Dolj County

Crop	Gleysated cambic chernozem		Clayey chernozem		Reddish preluvosoil	
	Evaluation mark	Suitability class	Evaluation mark	Suitability class	Evaluation mark	Suitability class
Pasture	72	III	57	V	57	V
Meadow	50	VI	44	VI	44	VI
Apple tree	80	III	80	III	64	IV
Pear tree	90	II	81	II	64	IV
Plum tree	81	II	90	II	72	III
Cherry tree	72	III	100	I	80	III
Apricot tree	70	IV	90	II	72	III
Peach tree	70	IV	90	II	72	III
Vine – wine	80	III	100	I	80	III
Vine – table	80	III	100	I	80	III
Wheat	81	II	90	II	72	III
Barley	81	II	72	III	72	III
Maize	90	II	90	II	72	III
Sunflower	81	II	58	V	64	IV
Potato	64	IV	80	III	57	V
Sugarbeet	90	II	72	III	72	III
Soybean	81	II	90	II	72	III
Pea – bean	81	II	90	II	72	III
Flax oil	81	II	72	III	64	IV
Flax linen	72	III	90	II	64	IV
Hemp	81	II	81	II	64	IV
Lucerne	81	II	64	IV	64	IV
Clover	64	IV	64	IV	51	V
Vegetables	90	II	72	III	72	III

Table 2.

Fruit yields obtained in 2015-2018 period

Species	Yield, t/ha				Av. t/ha	Crop system	Surface ha
	2015	2016	2017	2018			
Apple tree	10.5	11.0	11.0	12.5	11.25	Classic	7
Plum tree	5.5	7.0	6.1	6.9	6.3	Classic	10

Analyzing the results obtained in wine grapes, we can see here good yields compared to other communes, however below the level of productions that could be obtained, due to the pedoclimatic conditions in the area. Thus, in table 3, it is observed that the highest yields were obtained from the white Feteasca variety, on average 8.5 t / ha, which is correlated with the pedological

conditions in the area. In the Italian Riesling variety, the average yield obtained was 8.3 t / ha.

Table 2.

Wine grapes yields obtained in 2015-2018 period

Varieties	Yield (t/ha)				Average t/ha	Surface
	2015	2016	2017	2018		
Feteasca alba	8.5	8.0	8.8	8.2	8.5	4
Riesling italian	8.1	8.9	8.0	8.1	8.3	

The yields obtained are lower here as well as with fruit tree species, this being due also to negligence and in particular due to the climatic conditions (the sum of the hours of insolation being insufficient), failure to perform proper plowing, failure to apply chemical fertilizer in sufficient dose. Interpreting the results of the qualitative analyzes in fruit and grapes (table 4.) it is found that in apples the quantity of dry matter is 14.2% and in plums it is 19.0%, which shows that in the area the fruits find good conditions for storage. Analyzing the percentage of sugar it is observed that it is 8.3% in apples and 16.2% in grapes.

Table 3.

The fruit content of dry matter, sugar, and acidity

Fruit	Dry matter %	Sugar %	Acidity,% malic acid
Mere	14,2	8,3	0,30
Prune	19,0	9,8	1,0
Struguri	20,0	16,2	0,5

These contents are due to the climatic conditions (the sum of the temperature degrees) in the area. The total acidity expressed in malic acid obtained from laboratory analyzes is 0.30% in apples and 0.5% in table grapes, in plums being 1.0%. These analyzes highlight the favorability for horticultural species. In conclusion, the field observations and analyzes show that horticultural species find good conditions in the village of Diosti, Dolj County, therefore we recommend that this sector be expanded. In order to obtain the highest yields, it is recommended that in the commune of Diosti more attention be paid to the care work in the plantation, controlling diseases and pests in time, applying fertilization according to the agrochemical mapping.

CONCLUSIONS

From the analysis carried out it was observed that the two types of chernozem (clayey and gleysated cambic), are soils with a high productive potential and the culture of the cereals is indicated. These soils are well supplied with nutrients. The reddish preluvosoil, formed on slopes and pseudoteraces, with a slope of more than 15% with southern and northern exposure is used for vineyards. Concerning the demands of the national economy, agriculture is of great importance to them, one of them being reccomended to set up vine plantations on sloping lands, which cannot be occupied by other crops, by making terraces, etc. In conclusion, it can be said that the soils from the commune of Diosti, Dolj County, have a high fertility and on them they find good conditions of development most of the horticultural plants.

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