

## **STUDY ON THE SOILS OF GORJ COUNTY AND THEIR QUALITY**

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### **ABSTRACT**

Considering the natural environment, as well as the existing environmental conditions in the Gorj County, a great variety of soils have evolved, at the county level, the soils falling into eight soil classes, on an area of 192,405.22 ha and complexes and associations of soils on an area of 51,362.78 ha.

The distribution of the lands on quality classes was done following the rating. The rating was made according to the soil, relief and climate. Regarding the average by quality classes, the agricultural area of the Gorj County falls into the fourth quality class with an average score of 36 points.

### **INTRODUCTION**

Soil is one of the most important natural resources for the survival and well-being of mankind. At the same time, this resource is fragile and can easily suffer degradation processes, so that humanity must consider promoting the optimal use of land, maintaining and improving soil productivity and conserving soil resources.

The Gorj County is located in the southwestern part of Romania ("Upper Oltenia Country"), in northern Oltenia on the middle course of the Jiu River. The total area of the county is 5,601 km<sup>2</sup> (560,174 ha), representing 2.35% of the country's surface, ranking 21<sup>st</sup> in terms of area. The 560,174 ha, which represent the total area of the county, cover a natural setting of great variability: the plateau area, the depression and the mountain area, which are represented as follows: 243,768 ha of agricultural land, 273,868 ha of forests, 10,251 ha of non-productive land and 25,787 ha of other uses (water, roads, constructions) (Mihaela Balan, 2010).

In the Gorj County, agriculture has a special importance as an economic branch, first of all for supporting the subsistence level of the local population. For this reason, it is necessary to know the soil as thoroughly as possible, of its quality, which influences its productive capacity.

## MATERIAL AND METHOD

The grouping of soils in the Gorj County, by soil classes, was done following numerous pedology studies undertaken by the pedologist team from the Gorj O.S.P.A.

The inventory of soils was made depending on the soil type, according to the “Romanian Soil Classification System” (1979) elaborated by Bucharest I.C.P.A., correlated with “Soil taxonomy at higher level” (S.R.T.S.) elaborated by Florea and Munteanu (2003).

## RESULTS AND DISCUSSIONS

Considering the natural environment, as well as the existing environmental conditions in the Gorj County, a great variety of soils has evolved, so the soils of the Gorj County are divided into three categories, which in turn comprise eight classes of soils, (figure 1):

1. Zonal soils represented by:

- Luvisols class;
- Spodosols class.

2. Intrazonal soils represented by:

- Cambisols class;
- Pelisols class;
- Chernisols class (Mollisols);
- Hydrisols class.

3. Azonal soils represented by:

- Protisols class;
- Anthrosols class.

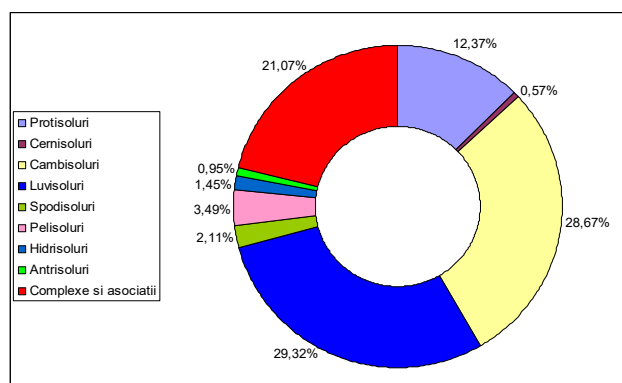


Fig.1 Percentage distribution of each soil class in the Gorj County

The distribution according to the participation percentages of each soil class within the agricultural area of the Gorj County is shown in figure 1.

As we have shown above, the Gorj County comprises eight soil classes, on an area of 192,405.22 ha and complexes and soil associations on an area of 51,362.78 ha (table 1).

Table 1

**The main soils in the Gorj County  
-scale 1:10000-**

Class No.	Class	Area		Soil Type	Agricultural area	
		ha	%		Ha	%
1	2	3	4	5	6	7
II	<b>CERNISOLS</b>	1.395,50	0,57	<i>Rendzina</i>	1.395,50	0,57
V	<b>LUVISOLS</b>	71.482,81	29,32	<i>Reddish Preluvosoil</i>	16,96	0,006
				<i>Preluvosoils</i>	16.778,96	6,88
				<i>Luvosoils</i>	23.088,24	9,47
				<i>AlbicLuvosoil</i>	30.907,25	12,68
				<i>Planosoil</i>	691,40	0,28
IV	<b>CAMBISOLS</b>	69.894,36	28,67	<i>Eutricambosoil</i>	57.823,43	23,72
				<i>Typical Districambosoil</i>	5.890,70	2,42
				<i>RhodicEutricambosoil</i>	1.720,50	0,71
				<i>Umbric Districambosoil</i>	4.459,73	1,83
VI	<b>SPODOSOLS</b>	5.131,84	2,11	<i>Prepodzol</i>	2.983,50	1,22
				<i>Podzol</i>	2.148,34	0,88
IX	<b>HYDROSOLS</b>	3.544,45	1,45	<i>Gleysols</i>	1.310,85	0,54
				<i>Stagnosols</i>	2.233,60	0,91
VII	<b>PELISOLS</b>	8.495,42	3,48	<i>Pelosoil</i>	3.821,00	1,57
				<i>Vertosoil</i>	4.674,42	1,92
I	<b>PROTISOLS</b>	30.143,80	12,36	<i>Lithosoil</i>	337,92	0,14
				<i>Regosoil</i>	6.154,37	2,52
				<i>Psamosol</i>	4,15	0,002
				<i>Aluviosoluri???</i>	5.327,35	2,18
				<i>Entiantrosol</i>	18.320,01	7,51
XII	<b>ANTHROSOLS</b>	2.316,74	0,95	<i>Erodisols</i>	2.125,00	0,87
				<i>Anthrosols</i>	191,74	0,08
	<b>COMPLEXESAND ASSOCIATIONS</b>	51.362,78	21,07	<i>Complexesand associations</i>	51.362,78	21,07
	<b>TOTAL</b>	243.768,00	100	-	243.768,00	-

The Cernisols (Molisols) class occupies an area of 1,395.5 ha, which represents 0.57% of the agricultural area, in this class the yields are included.

Luvosols (Argilluvosols) the class occupies an area of 71,482.81 ha, representing 29.32% of the agricultural area of the county; in this class the following types of soils fall:

- reddishpreluposol 16,96 ha (0,006%);
- preluposols 16.778,96 ha (6,88%);
- luvisols 23.088,24 ha (9,47%);
- albicluvisol 30.907,25 ha (12,68%);
- planosol 691,4 ha (0,28%).

The Cambisols class occupies an area of 69,894.36 ha (28.67% of the agricultural area); in this class the following types of soils are found:

- eutricambosol 57.823,43 ha (23,72%);
- typicaldistricambosol 5.890,70 ha (2,42%);
- rhodiceutricambosol 1.720,5 ha (0,71%);
- umbriandistricambosol 4.459,73 ha (1,83%).

The Spodosols class occupies an area of 5,131.84 ha (2.11% of the agricultural area); in this class the following types of soils are found:

- prepodzol 2.983,50 ha (1,22%);
- podzol 2.148,34 ha (0,88%).

The Hydrosols class occupies an area of 3,544.45 ha (1.45% of the agricultural area), which are found in areas with excess moisture, both rainfall and groundwater. The following types of soils belong to this class:

- gleysol 1.310,85 ha (0,54%);
- stagnosols 2.233,60 ha (0,91%).

The Pelisols (Vertisols) class occupies an area of 8,495.42 ha (3.48% of the agricultural area), having the following types of soils:

- pelosol 3.821 ha (1,57%);
- vertisol 4.674,42 ha (1,92%).

The Protisols class occupies an area of 30,143.80 ha (12.36% of the agricultural area), having the following types of soils:

- lithosol 337,92 ha (0,14%);
- regosol 6.154,37 ha (2,52%);
- psamosol 4,15 ha (0,002%);
- aluviosols 5.327,35 ha (2,18%);
- entiantrosol 18.320,01 ha (7,51%).

The Anthrosols class occupies an area of 2,316.74 ha (0.95% of the agricultural area). The following types of soils belong to this class:

- erodisols 2.125,00 ha (0,87%);
- anthrosols 191,74 ha (0,08%).

Complexes and soil associations occupy an area of 51,362.78 ha (21.07% of the agricultural area), meeting on battered slopes with uneven slopes and higher than 20%, where erosion processes and landslides are more intense.

Regarding the grouping of agricultural lands by quality classes, this was done following the rating, at the scale 1:10.000 (table 2).

The rating was made according to the soil, relief and climate. Table 2 shows the low proportion of second class land for all uses (15,504 ha), which represents 6.36% of the total agricultural area by 65 points.

The arable area included in the second quality class occupies 4,971 ha, which represents 4.89% of the total arable area.

Regarding the third quality class, the arable area included in this quality class is 26,154 ha, which represents 25.74% of the total arable area.

The largest agricultural area, i.e. 140,898 ha, which represents 57.8% of the total agricultural area, falls into the fourth quality class, which demonstrates the complexity of the relief and soils in the Gorj County.

The arable area with the largest share, namely 62,502 ha, representing 61.5% of the total arable area, falls into the fourth quality class.

The fifth quality class includes 31,130 ha, which represents 12.77% of the overall agricultural area.

Regarding the average by quality classes, the agricultural area of the Gorj County falls into the fourth quality class with an average score of 36 points.

Table 2

**Distribution of the agricultural area in the Gorj County by quality classes and ways of use  
(Scale 1:10.000)**

Item No.	Use	Area Ha	Quality Class													
			II			III			IV			V			Class	
			Area ha	Points No.	%	Area ha	Points No.	%	Area ha	Points No.	%	Area ha	Points No.	%	Average	Points No.
1	Arable	101.622	4.971	65	4,89	26.154	43	25,74	62.502	34	61,50	7.995	18	7,87	IV	36
2	Pastures + hayfields	122.070	10.050	67	8,23	27.031	45	22,14	63.891	33	52,34	21.098	17	17,28	IV	35
3	Vines	7.604	216	64	2,84	946	41	12,44	5.465	31	71,87	977	15	12,85	IV	31
4	Orchard trees	12.472	267	61	2,14	2.105	44	16,88	9.040	31	72,48	1.060	18	8,50	IV	32
5	Agricultural total	243.768	15.504	65	6,36	56.236	44	23,07	140.898	33	57,80	31.130	17	12,77	IV	36

## CONCLUSIONS

Due to the natural environment, as well as the existing environmental conditions, in the Gorj county a great variety of soils have evolved, so the soils are divided into three categories, being represented by 8 classes of soils as follows: zonal soils (represented by 2 classes of soils and namely Luvisols class and Spodosols class), intrazonal soils (represented by 4 soil classes namely Cambisols class, Pelisols class, Chernisols class and Hydrosols class), and azonal soils (represented by 2 soil classes namely Protisols class and Anthrosol class).

Thus, the Gorj county includes eight soil classes, on an area of 192,405.22 ha and complexes and soil associations on an area of 51,362.78 ha, the largest share having the class of Luvisols (Argilluvisols) which occupies an area of 71,482.81 ha, representing 29.32% of the agricultural area of the county, followed by the class of Cambisols occupying an area of 69,894.36 ha (28.67% of the agricultural area) and then by complexes and soil associations occupying an area of 51,362.78 ha (21.07% of the agricultural area).

Regarding the quality of agricultural land in the Gorj County, the low proportion of second class land for all uses (15,504 ha) was highlighted, which represents 6.36% of the total agricultural area with 65 points. The arable area with the largest share, namely 62,502 ha, representing 61.5% of the total arable area, falls into the fourth quality class.

Regarding the average by quality classes, the agricultural area of the Gorj County falls into the fourth quality class with an average score of 36 points.

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