RESEARCH ON LIMITING FACTORS OF LANDSCAPE PRODUCTIVITY IN ABRAM LOCALITY, BIHOR COUNTY

Berchez Octavian*, **Berchez Daniela**

*University of Oradea, Faculty of Environmental Protection, Gen.Magherust., no.26, 410048, Oradea, Romania, e-mail: berchez_octavian@yahoo.com

Abstract

The researches regarding the limiting factors of the grassland productivity were carried out between 2016 - 2019. The correlation of the data obtained in the field during the research interval with the meteorological data made available by the ANM made it possible to identify the main limiting factors of the grassland productivity, to study them as a whole and to elaborate them. of the complex of agro-pedo-ameliorative measures to improve the trophic properties of these soils, in order to increase the fertility potential of the meadows and to establish the assortment of plants used for sowing.

Key words: *taxonomic soil unit, climatic regime, fertilizers, plant associations, productivity*

INTRODUCTION

The town of Abram presents the following geographical coordinates: 47 degrees, 94 minutes, 05 seconds latitude and 22 degrees, 22 minutes, 49 seconds longitude, being located in the northwestern part of Romania, Bihor county, being geographically located in within the cross-border river basin Crişuri, the river basin of the Barcău river, occupying an area of 67.67 Kmp of which the grasslands occupy 760.23 ha. It is located in the northeastern part of Bihor county, being administratively composed of eight villages: Abram (common residence), Cohani, Dijir, Iteu, Iteu Nou, Margine, Satu Barbă, Şuiug. It is contiguous to the east with the locality of Balc, to the N-E with the locality of Boianu Mare, to the north with the locality of Viişoara, to the west with the localities of Marghita and Tăuteu, to the south and southeast with the locality of Tăuteu and the locality of Popeşti supply, fertility, taxonomic unit, trophicity, limiting.

MATERIAL AND METHOD

The following aspects were taken into account during the research:

The collection in the field of a sufficient number of elements related to the soil and the natural conditions, so that the basic data for the soil and the environment can allow the solution of any practical problems related to the better use and capitalization of the soil resources.

Defining as precisely as possible the elements of soil and environment that are collected in the tern and serve as elements for separating the taxonomic units from the soil and expressing them in quantitative aspect, so that the intervals established after the analysis have ecological significance, or reflect changes of practical importance.

The organization of the basic elements collected from the field in a systematic form, so that the subsequent processing and use can be facilitated and the subsequent interpretation of the results for various purposes.

Establish a way of presenting the pedological data on the map in accordance with the obtained results and a form of table of characterization of the soil units shown on the map by the elements collected in the field and by the data obtained by soil analysis or by derived characteristics.

Elaboration of criteria of specific criteria for data interpretation in order to evaluate the land for various purposes and to establish improvement requirements under different conditions of land use and territorial planning.

The correct systematization of data, so as to allow their insertion in the database for the purpose of storage and processing and subsequent use.

RESULTS AND DISCUSSION

Elements regarding the natural framework of soil formation and evolution

In order to identify the limiting factors of grassland productivity, it was necessary to define as precisely as possible the soil and environmental elements so that the intervals established following the analysis have ecological significance, or reflect changes of practical importance and the correct storing of data, to allow their introduction in the database for further storage and processing and use.

Geology

The lithological substrate on which the soils were formed and evolved is represented by Neogene deposits from Panonian, Ponţian and Pleistocene, being made up of marls, agile, calcareous clays, loesside clays, sandstone, gravel as varied as granulometry, coarse sands, fluvial sediments (alluviums, sludge sands) and rarely chemical facies sediments (limestone, soda ash and limestone).

Geomorphology

The territory of Abram is located in the Carpathian Province, the Sub-Province of the Panonian Depression, the Western Piedmont Region, the Hodişa-Oradea Hills district on the western side of the Crasnei hills. The complex forms of relief, the general appearance, the altitude and the general exhibition of the territory, allowed the classification of the relief step “up the hill”. The terrain configuration is generally wavy or flat, less fragmented

(except for small areas located in the forest floor), the simple forms of relief being generally represented by meadows, plateaus, slopes, rarely ridges, ridges or other forms of relief. The maximum altitude is 370m,

Hydrology

The territory of the locality is a component of the river basin of the Barcău river, the hilly sector (the boundaries of the hilly sector are located along the Barcău river between the localities Nuşfalău upstream and Marghita downstream).

The average water depth is 0.5-1m, except for certain portions, where the water depth can reach up to 2m. It is characterized by great unevennesses regarding the water depth, the nature of the bottom, the shape of the shore, etc. The flow of the river is very variable from 0.5 mc / sec to 15 mc / sec during the floods. The average flow is around 1.5-2 cubic meters / sec. In the years characterized by high rainfall, frequent spills occur, causing floods.

The groundwater is found at different depths depending on the relief, so in the meadow area of the Barcău river the depth is 0.5 - 2 m, on terraces 4-6 m, and on the higher relief units it is greater than 6- 8 m, not influencing the physical, chemical and biological properties of the soil, respectively the floral composition of the grasslands. It presents a low to medium degree of alkaline, bicarbonate-sulfate-calcium-magnesium type, low chlorine content.

The hydrological regime is variable during the year, with higher spring flows, as a result of the melting of snow, followed by floods caused by the rains at the beginning of summer, with low flows throughout the summer, autumn and early winter.

Climatology

The communal territory of Abram is characterized by a temperate continental-moderate climate of hills, included in the climatic province Cf, the sub-province Cfbx.

The thermal regime

The average annual temperature is 8.5C. The average temperature in seasons is -1,2C in winter, 10C in spring, 19C in summer and 10C in autumn. The number of summer days (max. 25C) is 82 and the number of winter days (max. 0C) is 38. The number of frost days is maximum 118. The average temperature during the vegetation period is 15.8C, the first frost occurs in around October 11 and the last freeze around March 21.

The multiannual average temperature on the surface of the soil has values of 10.76C with a maximum recorded in 2000 of 11.6C and a minimum of 9.8 at the level of 1996.

The rainfall regime

The average annual rainfall is 644 mm with a minimum recorded in 2000 of 410 mm and a maximum of 834 mm in 1996, during the vegetation period of the plants having a value of 430 mm. The first snowfall is around November 15 and the last one is around March 15. The number of snow days on the surface of the soil increases from December to the end of January, after which it decreases until the end of March, the annual average being 35 days, the snow layer having a protective role on the soil, influencing the thermal conditions and implicitly the biochemical processes in soil. Following the multiannual monthly analysis of precipitations, there is an unequal and uneven distribution, presenting a minimum interval for the months of January-February, it registers a progressive increase from March to June, it stays constant in September at the level of May, in October. A new decrease is registered, so that later in December there will be an increase. It is highlighted as a month rich in rainfall in January and poor (dry) in June.

Wind regime

The predominant winds are recorded from the West and North-West direction, having an annual average frequency of 12.6%, respectively 11.4% with an average speed of 2-4,2m / s. The calm period during the year has an average of 40%.

Synthetic indicators of climate data

The aridity index of Martonne achieves an annual average value of 34.8 Nebulosity, expressed in tenths of covered sky has an annual average of 6.2.

The bioactive period is between March 15 and November 30, lasting about 270 days.

The vegetation period is between April 20 and October 30, with an average duration of 175 days.

The presented climatological data place the territory of Balc in an area characterized by mild winters and quite hot summers.

Vegetation

For the purpose of in-depth study of the vegetal carpet, phytocenological surveys were carried out here. In all cases, bioforms, geo-elements, as well as ecological indices (humidity, temperature and soil reaction) were analyzed.

The fruit trees mainly cultivated are plum, apple, cherry, cherry, peach, apricot, walnut, clove and mulberry.

The natural meadows are varied from a floristic point of view, the dominant being the mesophile and mesoxerophil groups, and in the areas with groundwater closer to the surface, the mesophile and hydrophilic groups prevail. The grasslands of the hilly area are composed of species

such as Festuca pseudovina and F. pratensis, Agrostis tenuis, Poa pratensis, Alopecurus pratensis, Bromus spp., Cynodon dactylon, Lotus corniculatus and L. tenuis, Medicago falcata, Trifolium repens, Andropogon ischaemum.

On sunny slopes species such as Agropyron repens, Rubus caesius, Stipa spp. are encountered. These meadows are found in the nemoral area, namely in the sub-areas of pedunculated oak forests Quercus robur, of the sky forests. Quercus cerris, Quercus petraea, Carpinus betulus, Fagus silvatica, lime Tillia parviflora, Sallix, Popullus sp. To which the jug was added (Acer campestre), A. tataricum, Ulmus foliacea, Fraxinus angustifolia, Carpinus betulus, Populus tremula, Cerasus avium, Tillia tomentosa, T. cordata, etc., and on the northern slopes of the higher hills there is Fagus sylvatica.

Among the shrubs we mention: the Corylusa vellana, Cornus mas, C. sanguinea, Crataegus monogyna, Prunus spinosa, Rosa canina, Ligustrum vulgare, Sambucus nigra, Clematis vitalba. Along the valleys, a meadow vegetation formed from softwood flakes: Salix alba, S. fragilis, Populus alba, P. nigra, Alnus glutinosa.

Dows in the studied area are made up of species such as Festuca valesiaca and Festuca rupicola, Agrostis tenuis, Poa bulbosa, Lolium perenne, Dactylis glomerata, Alopecurus pratensis, Bromus sp., Cynodon dactylon, Dactylis glomerata, Lotus corniculatus, Trifolium repens, Medicago lupulina, L. tenuis, Vicia angustifolia, Medicago falcata (culbuceasa), Astragalus onobryumis, Tragolius, Andropogon ischaemum. Agropyron cristatum, Rubus caesius, Stipa spp., Crataegus monogyna, Rosa canina. The species from other botanical families are: Plantago lanceolata, Cichorium intybus, Taraxacum officinale, Gallium verum, Achillea millefolium, Daucus carota, Fragaria viridis, Carum carvi, Pimpinella saxifraga, etc.

Among the most common non-valuable species are: Salvia pratensis, Pulsatilla montana, Thymus glabrescens, Prunella vulgaris, Linum austriacum, Eryngium campestre, Carduus acanthoides, Echium vulgare, etc.

Associations of Carex spp., Juncus effuses, Juncus conglomeratus, Luzula campestris and rarer of Typha latifolia, Phragmites communis, accompanied by Gratiola officinalis, Mentha piperita, Bides tripartite. Also rare species were identified: Sparganium erectum, Alisma gramineum, Sagittaria heterophylla, Juncus x royeri, etc.

Commonly grown plants are wheat, barley, corn, soy, potato, beans, alfalfa, clover.

The meadows of Festuca valesiaca and Festuca rupicola have a pastoral value between 0.75 and 1.25 after the specific cover, respectively

15-25 after the specific contribution, falling in the category of weak meadows from a productive and qualitative point of view.

Naturally without any technological intervention, 0.6-1.0 t / ha are obtained from these grasslands. (3-5 t / ha M.V.) and 65-160 kg / ha P.B.D., achieving an average load of 0.3-0.5 U.V.M./ha.

The forest area of Abram belongs from an administrative point of view belongs to the National Board of Forests-Romsilva, Oradea Forestry Direction, Marghita Forestry District, Production Unit III Fagu-Balc.

The Production Unit III Fagu-Balc is located on the F.D.-2 vegetation floor - hilly of oak (GO, CE, GÎ and mixtures of these - gorun, sky, grous.

The vegetation of the forest area

The woody vegetation is made up of deciduous forests, along with small areas of softwoods. In the composition, deciduous forests have the following species: Quercus robur, Quercus petraea, Quercus cerris, Fagus silvatica, Fraxinus excelsior, Carpinus betulus, Acer pseudoplatanus, Robinia pseudocacia, Tilia argentea, Juglans nigra, Populus alba and Populus tremula, Salix sp.

The researches revealed the existence in the study area of 6 subtypes of soils, belonging to the Luvisoluri class.

In order to carry out the rehabilitation work in order to establish the favorability classes for pastures for each unit of territory, the units of homologous ecological territory were established according to the intensity with which the natural factors are manifested.

Table 1

The units of homogeneous ecological territory

Crt. No.	Nr. Unit. TEO	Area (ha)	Soil units	topo. No. (constituent plots)
1	TEO 1	56.58 ha	Luvosol tipic	192, 195, 196, 197, 205, 206, 211, 214, 215, 216, 219, 226, 227, 228, 229, 230, 231
2	TEO 2	130,07 ha	Preluvosol tipic	682, 683, 727, 732, 733, 734, 735, 736, 738, 742, 753, 759, 760 776, 777, 778, 781, 793, 794, 795, 796, 797, 798
3	TEO 3 B	45,89h	Luvosol tipic	1258,1263,1262,1246,1247, 1251,1249, 1166,1170,1171,
	TEO 3 A		Luvosol tipic	1274/1
4	TEO 4 A	72,03 ha	Luvosol stagnic	1315, 1281,1274
	TEO 4 B		Luvosolalbic tipic	1305,1306,1311, 1307,1312, 1302,1369, 1375,1378, 1493, 1495
5	TEO 5 A	162,47	Luvosol tipic	2285/1, 2285/2, 2287/1, 2287/2, ,2288, 2289/1, 2289/2,
	TEO 5 B		Luvosolalbicstagnic	2325,2267,2269,2266,2378,2283,2270/3, 2320,2300, 2307, 2309,2270/2
6	TEO6A	131,55 ha	Luvosol tipic	2607, 2609, 2728, 2729, 2735, 2731, 2757,
	TEO6B		Preluvosol tipic	2601,2602, 2604,2605/1, 2610, 2611, 2579/2, 2583, 2579/1, 2579/2, 2596
7	TEO7A	97,06 ha	Preluvosol tipic	2832, 2820, 2831, 2829/2, 2829/3, 2850, 2852, 2829/4
	TEO7B		Luvosol tipic	2788/1, 2788/2, 2793, 2794, 2795, 2797, 2831,
8	TEO8A	128,32 ha	Preluvosol tipic	1903/2, 1902, 1888, 1880, 1879, 1878, 1874, 1925, 1926, 1809
	TEO8B		Preluvosolstagnic	2025, 2065, 2000, 2032, 2033, 2036, 2037, 2027

Table 2 shows the favorability classes for grassland, at the level of the entire locality.

Table 2

The favorability classes for grassland, determined at the level of the entire locality

Crt. No.	Nr. territorial unit	Nr. cadastral plot	Grade of favorability
1	TEO 1	192, 195, 196, 197, 205, 206, 211, 214, 215, 216, 219, 226, 227, 228, 229, 230, 231	II
2	TEO 2	682, 683, 727, 732, 733, 734, 735, 736, 738, 742, 753, 759, 760 776, 777, 778, 781, 793, 794, 795, 796, 797, 798	II
3	TEO 3 A	1274/1	I
	TEO 3 B	1258,1263,1262,1246,1247, 1251,1249, 1166,1170,1171,	II
4	TEO 4 A	1315, 1281, 1274	III
	TEO 4 B	1305,1306,1311, 1307,1312, 1302,1369, 1375,1378, 1493, 1495	III
5	TEO 5 A	2285/1, 2285/2, 2287/1, 2287/2, ,2288, 2289/1, 2289/2,	II
	TEO 5 B	2325,2267,2269,2266,2378,2283,2270/3, 2320,2300, 2307, 2309,2270/2	II
6	TEO 6 A	2607, 2609, 2728, 2729, 2735, 2731, 2757,	II
	TEO 6 B	2601,2602, 2604,2605/1, 2610, 2611, 2579/2, 2583, 2579/1, 2579/2, 2596	II
7	TEO 7 A	2832, 2820, 2831, 2829/2, 2829/3, 2850, 2852, 2829/4	II
	TEO 7 B	2788/1, 2788/2, 2793, 2794, 2795, 2797, 2831,	I
8	TEO 8 A	1903/2, 1902, 1888, 1880, 1879, 1878, 1874, 1925, 1926, 1809	III
	TEO 8 B	2025, 2065, 2000, 2032, 2033, 2036, 2037, 2027	III

Correction of acidity

Soils in permanent grasslands with an acidic pH need to correct the reaction by applying carbonate amendments. The main substances with which grasses are amended to correct acidity are: calcium carbonate (CaCO3); lime dust (CaO); extinguished lime dust [Ca (OH) 2]; manure removal foam from sugar factories and calcium residues from 55 chemical fertilizer factories. The average recommended doses (the need for calcareous amendments, expressed in tonnes CaCO3 / ha) for the grasslands of Balc are presented in table 3, applied every 10-12 years.

The amendments can be applied especially late autumn after the grazing season and sometimes in the winter windows as well as early spring, with mechanized means or in extreme cases with manual means. The modification of acid or alkaline soils is a mandatory condition for the radical restoration of degraded meadows and the establishment of high productivity sown meadows

Table 3

Need for limestone amendments (tonnes / ha)

Crt. No	Terit Unit	Plot No.	pH	Ah me/ 100g sol	Sb me/ 100g sol	Emergency	$CaCO_3$ t/ha
1	TEO 1	192, 195, 196, 197, 205, 206, 211, 214, 215, 216, 219, 226, 227, 228, 229, 230, 231	5.9	4.4	14.8	III	4.95
2	TEO 2	682, 683, 727, 732, 733, 734, 735, 736, 738, 742, 753, 759, 760 776, 777, 778, 781, 793, 794, 795, 796, 797, 798	6.1	7.9	17.6	I	8.88
3	TEO 3 A	1274/1	6.3	5.1	11.3	III	5.74
	TEO 3 B	1258,1263,1262,1246,1247, 1251,1249, 1166,1170,1171,	5.8	7.4	14.2	I	8.32
4	TEO 4 A	1315, 1281, 1274	5.8	7.2	15.9	I	8.10
	TEO 4 B	1305,1306,1311, 1307,1312, 1302,1369, 1375,1378, 1493, 1495	5.8	7.6	13.6	I	8.55
5	TEO 5 A	2285/1, 2285/2, 2287/1, 2287/2, ,2288, 2289/1, 2289/2,	5.85	6.1	12.4	III	6.86
	TEO 5 B	2325,2267,2269,2266,2378,2283,2270/3, 2320,2300, 2307, 2309,2270/2	6.1	6.6	14.4	II	7.42
6	TEO 6 A	2607, 2609, 2728, 2729, 2735, 2731, 2757,	5.7	6.1	12.4	III	6.86
	TEO 6 B	2601,2602, 2604,2605/1, 2610, 2611, 2579/2, 2583, 2579/1, 2579/2, 2596	6.2	6.9	15.9	II	7.76
7	TEO 7 A	2832, 2820, 2831, 2829/2, 2829/3, 2850, 2852, 2829/4	6.3	5.7	17.2	III	6.41
	TEO 7 B	2788/1, 2788/2, 2793, 2794, 2795, 2797, 2831,	5.8	7.7	14.4	I	8.66
8	TEO 8 A	1903/2, 1902, 1888, 1880, 1879, 1878, 1874, 1925, 1926, 1809	5.9	6.4	13.8	II	7.20
	TEO 8 B	2025, 2065, 2000, 2032, 2033, 2036, 2037, 2027	5.9	7.0	15.3	II	7.87

Soil fertilization

The most important factor of degradation of the grass carpet is the lack of fertilizing elements of which the most important are nitrogen, phosphorus and potassium. The cheapest method of fertilization of a pasture is the dragging with the animals during the grazing period. Traditional, normal, scientifically confirmed twinning is done with sheep: -2-3 nights 1 adult sheep / sq m on grass with corresponding grass carpet -4-6 nights 1 adult sheep / sq m on pastures invaded by Nardus stricta. However, this method, during the grazing season, can only improve 10% of the total area, once for 4-5 years as long as the dragging effect lasts. For a ton of green mass, 5 kg of N, 1 kg of P, 5 kg of K and 1 kg of calcium are extracted from the soil. If after several years of grazing, the organic fertilization is not supplemented with the chemical one, the content in the nutrients decreases, which leads to the radical change of the vegetal carpet in the sense of the disappearance of the plants with fodder value, more demanding to the soil supply with NPK and the gradual appearance until the domination of some ungodly weeds, who replace them. The application of chemical fertilizers

based on nitrogen, is done in fractions, in annual doses to avoid losses by leaching. Due to the very slow leaching of phosphorus, the administration of phosphate fertilizers can be done only once for several years (4-5), the grass plants tolerate high doses well if the other nutrients (N, K) are provided to the required level. Phosphatic and potassium fertilizers are applied on meadows in autumn, except when we use NPK complex chemical fertilizers when PK is applied concurrently with N in spring. The average quantities of fertilizers / ha / year required for grassland fertilization are: • 150 kg N • 50 kg P2O5 (P) • 60 kg K2O (K) active substance

Table 4

Situation regarding the state of soil supply in N, P, K

Crt. No.	Teritorial Unit	Plot No	N %	P ppm	K ppm
1	TEO 1	192, 195, 196, 197, 205, 206, 211, 214, 215, 216, 219, 226, 227, 228, 229, 230, 231	0,106	6,0	120
2	TEO 2	682, 683, 727, 732, 733, 734, 735, 736, 738, 742, 753, 759, 760 776, 777, 778, 781, 793, 794, 795, 796, 797, 798	0,140	8,0	90
3	TEO 3A	1274/1	0,102	8,0	140
	TEO 3B	1258,1263,1262,1246,1247, 1251,1249, 1166,1170,1171,	0,073	12	100
4	TEO 4 A	1315, 1281, 1274	0,100	3,4	120
	TEO 4 B	, 1305,1306,1311, 1307,1312, 1302,1369, 1375,1378, 1493, 1495	0,086	3,4	50
5	TEO 5 A	2285/1, 2285/2, 2287/1, 2287/2, ,2288, 2289/1, 2289/2,	0,125	12	100
	TEO 5 B	2325,2267,2269,2266,2378,2283,2270/3, 2320,2300, 2307, 2309,2270/2	0,098	5,7	50
6	TEO 6 A	2607, 2609, 2728, 2729, 2735, 2731, 2757,	0,190	9,0	120
	TEO 6 B	2601,2602, 2604,2605/1, 2610, 2611, 2579/2, 2583, 2579/1, 2579/2, 2596	0,180	9,0	120
7	TEO 7 A	2832, 2820, 2831, 2829/2, 2829/3, 2850, 2852, 2829/4	0,118	8,0	170
	TEO 7 B	2788/1, 2788/2, 2793, 2794, 2795, 2797, 2831,	0,118	9,2	90
8	TEO 8 A	1903/2, 1902, 1888, 1880, 1879, 1878, 1874, 1925, 1926, 1809	0,106	17	170
	TEO 8 B	2025, 2065, 2000, 2032, 2033, 2036, 2037, 2027	0,105	12	120

The average calculated amounts of fertilizers, kg / ha / year, expressed as active substance required for grassland fertilization are: 150 kg N, 50 kg P2O5 (P),60 kg K2O (K) active substance

Organic fertilizers

Table 5 shows the optimal doses of organic fertilizers recommended for application depending on the optimal dose of N, P, K, and the type of organic fertilizer used. Doses between 10 and 22t / ha are recommended.

Table no. 5 Optimum doses of organic fertilizers recommended for application depending on the optimal dose of N, P, K, and the type of organic fertilizer used.

Table 5

Optimum doses of organic fertilizers

Mode of fertilizer.	Optimal doses applied								
	organic fertilizer						N kg/ha	P P_2O_5 kg/ha	K K_2O kg/ha
	Ferment.3-4 month t/ha	Sheeps t/ha	Cows t/ha	Pigs t/ha	fresh t/ha	Ferment complet t/ha			
mixt	10	-	-				95	25	-
	-	10	-	-			67	27	-
	-	-	10	-			105	27	10
	-	-	-	10			105	31	-
					10		100	25	-
						10	52	-	-
chemical	-	-	-	-	-	-	150	50	60
mixt	12						84	20	-
		12					50,4	22,4	-
			12				96	22,4	-
				12			96	27,2	-
					12		90	20	-
						12	32,4	-	-
chemical							150	50	60
mixt	14						73	12,5	-
		14					33,8	17,8	-
			14				87	17,8	-
				14			87	23,4	-
					14		80	15	-
						14	12,8	-	-
chemical							150	50	60
mixt	16						62	10	-
		16					17,2	13,2	-
			16				78	13,2	-
				16			78	19,6	-
					16		70	10	-
						16	-	-	-
chemical							150	50	60
mixt	18	-	-	-			51	5	-
	-	18	-	-			-	8,6	-
	-	-	18				69	8,6	-
				18			19	15,9	-
					18		60	5,0	-
						18	-	-	-
chemical	-						150	50	60
mixt	20						40	-	-
		20					-	4	-
			20				60	4,0	-
				20			60	12	-
					20		50	-	-
						20	-	-	-
chemical	-						150	50	60
mixt	22						29	-	-
		22					-	-	-
			22				51	-	-
				22			51	8,2	
					22		40	-	-
						22	-	-	-
chemical	-						150	50	60
mixt	24						18	-	-
		24					-	-	-
			24				42	-	-
				24			42	4,4	-
					24		30	-	-
						24	-	-	-
chemical							150	50	60

Another factor that contributes significantly to the decrease of grassland productivity is the manifestation of the vertical phenomena recorded during the summer periods on the soils affected by humidity. In the panels no. 1, 2, 3, the effects of the swelling phenomena are presented with the appearance of a gilgay relief.

Fig. 1. Soil affected by vertical phenomena

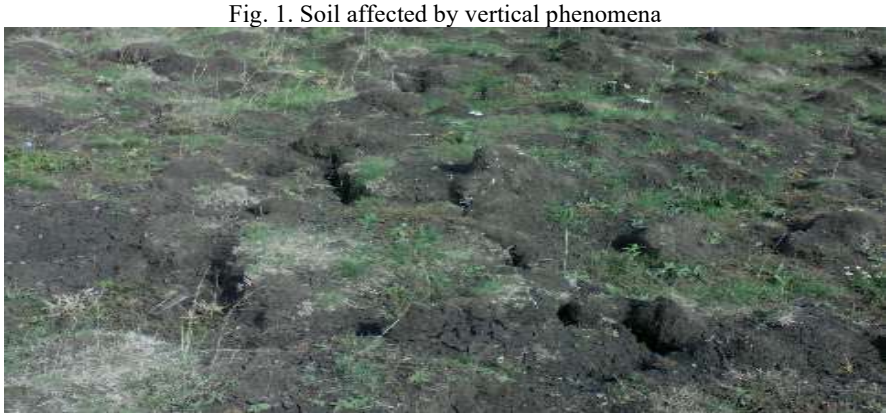

Fig. 2. Soil affected by vertical phenomena

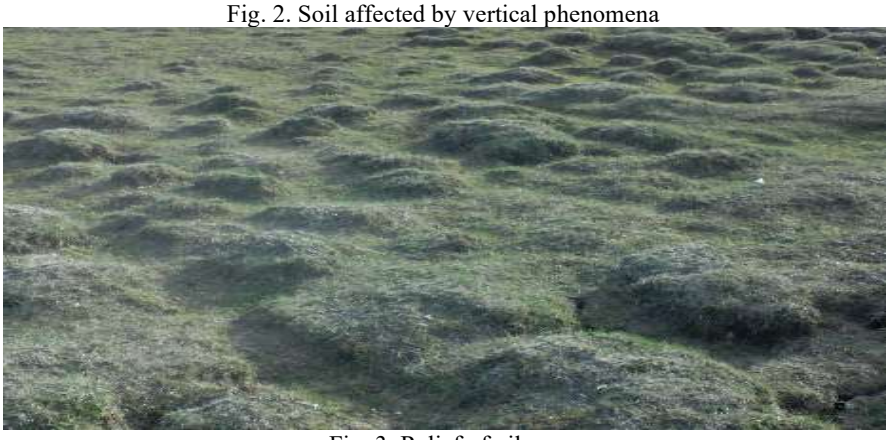

Fig. 3. Relief of gilgay

CONCLUSIONS

In order to achieve high productions of fodder and of adequate quality, the grass carpet of permanent (natural and semi-natural) and temporary (sown) grasses needs to be supported by fertilization (organic and / or chemical) correction of the reaction. The most important factor of degradation of the grass carpet is the lack of fertilizing elements of which nitrogen, phosphorus and potassium (NPK) are noted. Therefore, after several years of harvesting, if it is not fertilized, on the meadow the nutrients in the soil are reduced, the vegetation is changed radically in the sense of the disappearance of plants with high nutritional value, more demanding when supplying the soil with NPK, a phenomenon that favors the gradual emergence, until the domination, of some species of unpretentious weeds, which take their place. The superficial mobilization of the soil will be carried out on the surfaces covered with works of deforestation of the woody vegetation and the application of amendments and chemical fertilizers. The replacement of degraded natural meadows with sown meadows is done only in cases where the methods of improvement by means of surface (fertilization, amendment, sowing) do not give the expected results.

Recommended grass mixtures for grassland sowing Mixtures of grasses of the species listed below will be used for planting and sowing operations listed below: Phleum pretense, Festuca pratensis, Festuca rubra, Dactylis glomerata, Lotifusum cornatus.

Elimination of excess moisture General considerations.

Excess humidity is one of the most unfavorable factors that decrease grassland production and quality. Most of the good forage species in the grass carpet are mesophilic, that is, they prefer resorts with average soil moisture. The elimination of the temporary excess of humidity in the meadows is done by drying by means of open channels, of different sizes, which are placed at different distances between them depending on the characteristics of the soil, the intensity of the rains, etc. The permanent excess is eliminated with the help of drains of different materials (slabs, large stone, fascines, ceramic and plastic reflecting tubes, etc.) placed at different depths and distances depending on the level of the groundwater and the intensity of drainage we want specialists from the field of land improvements.

On soils with excess moisture, the removal of excess moisture can be done by:

• making drainage ditches for surface water whenever necessary, especially in spring after the melting of snow or heavy rain;

• avoidance of grazing on wet ground which further impairs the soil, making it impervious to rainwater;

• corman plows before the establishment of the sown meadows and the directing of excess water in a collection channel and further in an emissary;

• cultivation of moisture-loving species such as willows, poplars, arines, etc. which make biological drainage, as well as some herbaceous species resistant to excess water such as Phalarisa rundinacea, Festuca arundinacea, Trifolium hybridum.

Fighting other weeds in the meadows (harmful plants)

Spread and harmful effect In the grass meadow of grassland together with perennial grasses and legumes, species from the "diverse" or "other species" group also participate, some of them have low feed value, and others are practically non-consuming, or have an animal feed. high toxicity. The appearance and propagation of weeds in the grassland vegetation is favored by the manifestation in excess or deficiency of some ecological factors, as well as by the inadequate management of the grasslands: non-execution of the cleaning works, the non-use of a load with animals suitable for the production of grasslands and non-livestock grazing, non-uniform fertilization with organic or chemical fertilizers, delayed harvesting of hay, use of overgrown seeds with weeds, etc. The control of weeds in the meadows is another specific work for the meadows that due to the complex floristic composition (grasses, legumes, other plants) in which a harmful species is usually fought, the remaining fodder species are kept as far as possible and then the meadow is continued through grazing. , mowed or mixed. These require the knowledge of both the effect that the control measures have by mechanical or chemical means on the species that make up the grass carpet and of the herbicide remnant in order not to cause disturbance to the animals, under the conditions of the use of the respective surfaces by grazing.

REFERENCES

1. Berchez O., 2015, Cheie pentru determinarea unităţilor taxonomice de sol la nivel superior: Sistemul Român de Taxonomie a Solurilor, corelarea cu Baza de Referinţă Mondială pentru Resursele de Sol (World Reference Base for Soil Resource) şi Sistemul American (USDA – Soil Taxonomy), . Ed. Universităţii din Oradea.
2. Blaga Gh., Rusu I., Udrescu S., Vasile D., 1996, Pedologie, Ed. Didactică şi Pedagogică, Bucureşti.
3. Canarache A., 1980, Fizica solurilor agricole, Ed. Ceres Bucureşti.
4. Canarache A., Merculiev O., Dumitru R., Trandafirescu T., Chiochiu V., Miciov I., 1971, Caracterizarea hidrofizică a principalelor soluri din Cîmpiaşi Piemonturile Vestice. Analele ICPA, vol. XXXVIII, 1970, Bucureşti.

5. Ciobanu Gh., Domuţa C., 2003, Eroziunea solurilor din Bihor în contextul sistemului de agricultură durabilă, Ed. universităţii din Oradea, Oradea.
6. Ciobanu Gh., Domuţa C., 2003, Eroziunea solurilor din judeţul Bihor, în cotextulsistemului de agricultură durabilă, Ed. Universităţii din Oradea, Oradea.
7. Canarache A., 1980, Fizica solurilor agricole, Ed. Ceres Bucureşti.
8. Florea N., Munteanu I., Rapaport C., Chiţu C., Opriş M., Geografia solurilor României, Ed. Ştiinţifică, Bucureşti.
9. Florea N., Munteanu I., 2012, Sistemul Român de Taxonomie a Solurilor, Ed. Sitech, Craiova.
10. Ianoş Gh., 1999, Pedogeografie, Ed. Mirton, Timişoara.
11. Ispas St., Murătoreanu G., Leotescu R., Ciulei S., (2006), Pedologie, cercetarea solului peteren, Ed. Valahia University Press, Târgovişte.
12. Miclăuş V., 1991, Pedologie ameliorativă, Ed. Dacia Cluj Napoca.
13. Măhăra Gh., 1972, Evoluţia Câmpiei de Vest a României, Realizări în Geografia României, Ed. ŞtiinţificăBucureşti.
14. Măhăra Gh., 1977, Câmpia Crişurilor, în volumul Crişul Repede, ŢaraBeiuşului, Ed. Ştiinţificăşi Enciclopedică Bucureşti.
15. Pop I., 1968, Flora şivegetaţia Câmpiei Crişurilor, Ed. Academiei RSR, Bucureşti.
16. Petrea R., 2001, Pedogeografie, Ed. Universităţii din Oradea, Oradea.
17. Pop P Gr., 2005, Dealurile de Vest şi Câmpia de Vest, Ed. Universităţii din Oradea, Oradea.
18. Posea Gr. 1997, Câmpia de Vest a României, Ed. Fundaţiei România de Mâine, Bucureşti .
19. Rogobete GH., 1993, Ştiinţa solului, Ed. Mirton, Timişoara
20. Rogobete Gh., Ţărău D., 1997, Solurile şi ameliorarea lor, Ed. Marineasa, Timişoara
21. Sabău N.C., Domuţa C., Berchez O., 1999, Geneza, degradarea şi poluarea solului, vol. I, Ed. Universităţii din Oradea, Oradea.
22. Sabău N.C., Domuţa C., Berchez O., 2002, Geneza, degradarea şi poluarea solului, Vol. II, Ed. Universităţii din Oradea, Oradea.
23. Şandor M., 2007, Ameliorarea solurilor cu exces de umiditate din Cîmpia Crişurilor, Ed. Universităţii din Oradea.