RESEARCHES ABOUT THE INFLUENCE OF MODERATE CONSERVATIVE TILLAGE REGARDING THE PHYSICAL AND CHEMICAL PROPERTIES OF A RED PRELUVOSOL FROM BANU MĂRĂCINE AREA

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Abstract*. Conservation tillage or moderat conservativ tillage, which leaves some or all of the residue from the previous crop on the soil surface, effectively protects the soil against erosion. Use of conservation tillage has other environmental implications as well, particularly for water quality, as the reduction in sediment and sediment-associated chemical losses; runoff is also less with conservation tillage, which can reduce losses of soluble or nonadsorbed chemical. This study presents influence of moderat conservativ agricultural technology, on physical and chemical soil properties, in Banu Mărăcine agricultural area, technologies that can protect and increase the soil fertility. The soil on which the expeditionary trials were conducted is a red preluvosol decarbonated, formed on loess deposits consisting of fine materials, clay, loam-clay. Over time (2000-2005), in the stationary perimeter were the study is conducted, were applied a conventional tillage; from 2006 were applied a moderately intensive technology, which led to satisfactory results of production, due to application of mineral fertilization, moderate to high doses of nitrogen and phosphorus and the optimal time of application to work. The soil samples were taken from the four soil profiles, from stationary perimeter, in two stages, in 2006, freshly worked field, after winter wheat crop emergence and after harvesting wheat crop in 2007. Were performed phisical and chemical laboratory analyses wich conducted to the conclusion that after moderat conservative technology were apllied, compactness, one of phisical indicator of the soil assessed by two parameters, density and degree of compaction, highlights the immediate negative residual effects of soil tillage, numerical values have been high in both stages, exceeding 18% v / v for compaction degree. This shows that anthropogenic compaction, induce by the conventional system, that were applied for many years in past, in the soil profile is present and very intense, so that makes it necessary to improve the physical conditions of the soil by applying scarification, as an immediate solution and also applying a moderat conservative tillage in the future. Water storage capacity, particularly those available is reduced, due to high fractions, determinated by the content of inactive fraction, by intense soil compactness, by low organic matter content in soil, therefore, measures are needed to improve agrotehnical measures, for physical properties improve and reserve storage capacity of water, especially those accessible to crops, not only by mechanical action, but also conservative tillage.*

Key words*: fertility, soil, tillage, agriculture, conservative*

INTRODUCTION

Soil degradation is an extremely complex process, which causes or enhances the action while one or more limiting or restrictive factors, being in close interdependence with the deterioration of various natural resources of the environment. Soil degradation is reducing its current capability and / or potential production. In conventional agriculture, it is recognized that the challenge, the acceleration and intensification of land degradation, be determined mostly by human activities, rather than by some natural factors limiting. Some natural factors limiting permanent so that they can not be removed, and therefore agricultural technologies must be adapted. For example, this category is included in the composition size or soil texture, too high content of clay or sand (ELISABETA DUMITRU, 2005).

In conventional agriculture, organic matter mineralization processes are accelerated because of the intensive work, of the scarcity of soil and plant debris or other organic material incorporated into the soil. The content of organic carbon in arable soils has declined sharply, while quality has deteriorated, affecting all other characteristics and processes. In the long term, low quality content and organic matter degradation has many negative consequences, the soil becomes more vulnerable to dissolution, erosion, acidification, salinization, nutrient imbalance, drought, etc. Effects on soil organic matter works have been studied over time, due to the consequences that humus has on structural stability, erosion, nutrient accessibility, agrochemicals properties and water pollution (DORAN, SARRANTINO & LIEBIG, 1996).

From a technology perspective, over the years, the conventional system was applied moderately intensive based on annual total return of the swath, and carrying a relatively high number of secondary works for seedbed preparation and crop maintenance with mineral fertilizers based on nitrogen and phosphorus, with short rotations, mainly wheat, maize grain yields varied from year to year, depending not only on the ground and applied technological system, especially the climatic factor, which is located in agriculture irrigated area.

Therefore, the major factor leading to obtain higher yields is insufficient water supply, available to plants during the growing season. Over the years, average yields was satisfactory because, applying appropriate doses of mineral fertilization and soil tillage in relatively satisfactory conditions.

MATERIAL AND METHODS

The perimeter is held stationary in a field, where over the years has been applied a conventional technology - moderately intensive cultivation of various agricultural plants (Table 1).

Table 1

Specific technologies and harvest in the Banu Mărăcine perimeter

Observed year	Culture	Main tillage	Second tillage-preparation of seedbed	NP	Crop Kg/ha
2000	*Wheat*	*Autumn* ploughing *at 25 cm*	Disk harrow ploughing + sown	*N 64*	*2642*
2001	*Maize*	*Summer* ploughing *at 20 cm*	*2 disk+sown*	*N88P88*	*3861*
2002	*Sun flower*	*Autumn* ploughing *at 25 cm*	*2 disk+sown*	*N66P66*	*1324*
2003	*Wheat*	*Autumn* ploughing *at 25 cm*	*2 disk+sown*	*N100P66*	*3009*
2004	*Maize*	*Summer* ploughing at *22 cm*	Disk harrow ploughing + *combinator + sown*	*N88P80*	*3524*
2005	*Wheat*	*Autumn* ploughing *at 25 cm*	Disk harrow ploughing + sown	*N64*	*2741*
2006	*Maize*	Disk harrow ploughing stubblefield	*2 disk+sown*	*N100P60*	*4235*
2007	*Wheat*	*Summer* ploughing *at 28 cm*	Disk harrow ploughing + *sown*	*N64P64*	*1020*

The table shows that, over time in the sole, where the stationary perimeter was located, was applied a moderately intensive technology, which led to satisfactory results of production, due to application of mineral fertilization, moderate to high doses of nitrogen and phosphorus and the optimal time of application to work. In a single year in 2006 was applyed a reduced tillage conventional technology, in this case, after maize harvest, disking operation was performed as a main job and seedbed was prepared by two tillage performed by the disc. The soil samples were taken from the four soil profiles, from stationary perimeter, in two stages, in 2006, freshly worked field, after winter wheat crop emergence and after harvesting wheat crop in 2007.

Specific stationary climate stationary perimeter

EDS analysis of climate data from Banu Mărăcine (table 2) indicate that 2007 was a drought year, having, in particular, during the growing season of most crop plants; temperatures are much higher than average temperatures and precipitation than the lower multiannual, compared with winter.

Table 2

Banu Mărăcine climate in 2007 at P2

Indicator / Month		I	II	III	IV	V	VI	VII	VIII	IX	X
Medium temperature, t^0C	2007	5.5	4.0	5.5	12.7	19.6	23.6	27.5	26.1	17.4	13.4
	Multiannual	-2.6	-0.2	4.8	11.4	16.8	20.9	22.1	22.0	17.5	11.4
Rainfall, mm	2007	16.5	31.0	54	0	11.0	36	6.0	132	73	82
	Multiannual	36.4	31.4	35.0	42.8	61.7	63.8	54.6	43.6	38	39.2
Relative humidity of air, %	2007	64	64	69	52	59	54.5	40.4	63.1	68.2	75

RESULTS AND DISCUSSIONS

Granulometric composition at four soil profil determined to a depth of 60 cm is medium, medium clay; clay content is between 23 to 30% and the sand (fine and coarse) is included between 52 and 45%. The depth was a sensible increase in clay content from 24.1% on average to 29.5% with a corresponding decrease in sand content (table 3). High percentage of inactive fractions of loam and sand lead to increase the soil dissolution, compaction, etc.

Table 3

Granulometric composition in the *Banu Mărăcine* perimeter

Fraction/ Depth	Observation Profiles				Statistical indicators				
	P1	P2	P3	P4	$\overline{X}$	s	Cv	s $\overline{X}$	IC
Clay content < 2µ									
0 - 15	25.2	24.9	23.4	22.8	24.1	1.2	4.8	0.6	20.7 - 27.5
15 - 35	24.7	26.6	23.3	24.0	24.7	1.4	5.8	0.7	20.5 - 28.8
35 - 45	24.1	26.2	26.8	23.4	25.1	1.6	6.5	0.8	20.4 - 29.9
45 - 60	30.9	30.9	29.3	26.8	29.5	1.9	6.6	1.0	23.8 - 35.1
Dust content (2 - 20µ)									
0 - 15	24.5	25.7	25.4	24.9	25.1	0.5	2.1	0.3	23.6 – 26.7
15 - 35	25.0	24.7	25.2	25.5	25.1	0.3	1.3	0.2	24.1 – 26.1
35 - 45	25.7	26.5	23.3	26.2	25.4	1.5	5.7	0.7	21.2 – 29.7
45 - 60	24.4	24.8	25.1	24.6	24.7	0.3	1.2	0.1	23.9 – 25.6
Sand content (20 – 200µ)									
0 - 15	31.3	30.2	30.0	30.5	30.5	0.6	1.9	0.3	28.8 – 32.2
15 - 35	30.8	30.7	31.4	30.2	30.8	0.5	1.6	0.2	29.3 – 32.2
35 - 45	32.5	29.0	28.7	30.1	30.1	1.7	5.7	0.9	25.0 – 35.1
45 - 60	25.0	24.9	26.0	28.8	26.2	1.8	6.9	0.9	20.9 – 31.5
Gravel content (200 - 2000µ)									
0 - 15	19.0	19.2	21.2	21.8	20.3	1.4	6.9	0.7	16.2 – 24.4
15 - 35	19.5	18.0	20.0	20.3	19.5	1.0	5.3	0.5	16.4 - 22.5
35 - 45	17.7	18.3	21.2	20.3	19.4	1.6	8.5	0.8	14.6 – 24.2
45 - 60	19.7	19.4	19.6	19.8	19.6	0.2	0.9	0.1	19.1 – 20.1
Textural class estimation in studied soil profiles									
0 - 15	Medium texture (L): clay medium (MM)								
15 - 35									
35 - 45									
45 - 60									

The state of compactness of the soil determined by two parameters, density and compaction degree, shows that in both stages, only the first 5 cm soil is slightly loose; the degree of compaction with numerical values between 0 ....- 9% v / v, and below 15 cm soil depth is strongly tamping affecting root mass entering and exploring a large volume of soil (table 4).

Table 4

Dynamic state of compactness of the soil in the Banu Mărăcine area

Depth/ indicator	Observation profiles				Statistics indicators				
	P1	**P2**	**P3**	**P4**	$\overline{X}$	**S**	**Cv**	**S** $\overline{X}$	**IC**
Apparent density (g.cm^{-3}) first stage: after wheat rising. october - 2006									
0 – 5	1.25	1.26	1.25	1.28	1.26	0.01	1.12	0.00	1.22 – 1.30
5 – 15	1.43	1.51	1.48	1.51	1.48	0.04	2.55	0.02	1.37 – 1.59
15 – 25	1.64	1.65	1.50	1.50	1.57	0.08	5.33	0.04	1.33 – 1.82
25 – 35	1.62	1.66	1.68	1.66	1.66	0.03	1.52	0.01	1.58 – 1.73
35 – 45	1.62	1.64	1.66	1.60	1.63	0.03	1.58	0.01	1.55 – 1.71
45 – 60	1.58	1.58	1.58	1.60	1.59	0.01	0.63	0.00	1.56 – 1.61
Apparent density (g.cm^{-3}) in second stage: in wheat stubblefield. july - 2007									
0 – 5	1.31	1.26	1.27	1.29	1.28	0.02	1.73	0.01	1.22 – 1.35
5 – 15	1.49	1.43	1.45	1.50	1.47	0.03	2.25	0.02	1.37 – 1.56
15 – 25	1.58	1.55	1.58	1.59	1.58	0.02	1.10	0.01	1.52 – 1.63
25 – 35	1.55	1.54	1.58	1.54	1.55	0.02	1.22	0.01	1.50 – 1.61
35 – 45	1.57	1.58	1.61	1.60	1.59	0.02	1.15	0.01	1.54 – 1.64
Compaction degree (%v/v) in first stage: after wheat rising. october - 2006									
0 – 5	-8	-8	-14	-8	-10	3	-32	2	-18 – -1
5 – 15	-5	13	6	11	9	4	34	2	-3 – 18
15 – 25	21	21	11	11	16	6	26	3	-1 – 23
25 – 35	20	23	24	23	23	2	8	1	17 – 26
35 – 45	20	24	23	18	21	3	13	1	13 – 26
45 – 60	20	21	20	20	20	1	2	0	19 – 22
Compaction degree (%v/v) in second stage: in wheat stubblefield. july -2007									
0 – 5	-4	-8	-10	-6	-7	2	-34	1	-14 – 0
5 – 15	11	5	5	10	8	3	38	1	1 – 16
15 – 25	16	15	16	17	16	1	5	0	14 – 19
25 – 35	14	15	16	13	15	1	8	1	11 – 18
35 – 45	16	21	20	17	18	2	13	1	11 - 23

Structural hidrostability is reduced as expected, due to the high content of sand and dust, inactive fraction not involved in the processes of aggregation and consolidation of structural aggregates and is a likely ground, both destructuring and crustification on the surface and compaction in the soil profile, affecting water infiltration processes as a result of macro-clogging space. Therefore, special measures are necessary to protect the soil by improving agricultural technology of plant cultivation.

Ground water permeability assessed by determining the laboratory conditions of saturated hydraulic conductivity, especially on deep soil profile had different numerical values. Thus, in the first 15 cm, in agreement with the state of loose soil settlements, numeric values are high, falling within the range of variation of 10.1 ... 35 mm • h-1, but below this depth decrease in medium values of 2.1 --- 10 mm • h-1, marking difficult conditions of deep penetration of water and facilitate excess in the soil profile in terms of rainfall.

Potential conditions of aeration are presented in table 5. The data presented shows that total porosity, aeration limit and differential porosity (porosity drained porosity and porosity useful inactive) have numerical values, except that the surface layer, the top 5 cm, shows a whole, found that soil technology in this condition, in both stages of observation, are not favorable conditions of aeration, rather they are deficient. Under the 20 cm soil depth in the agreement and submit to the state of compactness and structural hidrostability, unfavorable conditions for the normal processes of aeration, and water storage for water penetration and accessible, useful porosity is reduced, with numerical values below 10% v/v and inactive growth has a drift which favors water accumulation, inacccesibile for plants.

Table 5

Dynamics of total porosity and aeration limit – Banu Mărăcine

Depth/ Indicator	**Observation profile**				**Statistics indicators**				
	P1	**P2**	**P3**	**P4**	$\overline{X}$	**s**	**Cv**	**S** $\overline{X}$	**IC**
Total porosity (%) în first stage: after wheat rising – october 2006									
0 – 5	53	53	55	52	53	1	2	0	51– 56
5 – 15	47	44	45	44	45	1	3	0	41– 49
15 – 25	39	39	44	44	41	3	7	1	33– 50
25 – 35	40	38	37	38	38	1	3	0	35– 41
35 – 45	40	39	38	40	39	1	2	0	37– 42
45 – 60	41	41	41	401	41	0	1	0	40 – 42
Total porosity (%) in second stage: in stubblefield after wheat harvest - july 2007									
0 – 5	51	53	52	52	52	1	2	0	50 – 55
5 – 15	44	47	45	44	45	1	3	1	41 – 49
15 – 25	41	42	41	41	41	1	2	0	39 – 43
25 – 35	42	42	41	43	42	1	2	0	40 – 44
35 – 45	41	40	40	40	40	1	2	0	38 - 43
Aeration limit (%) in first stage: after wheat rising – october 2006									
0 – 5	35	34	36	33	35	1	4	1	30 – 39
5 – 15	26	23	24	22	24	2	7	1	19 – 28
15 – 25	18	18	23	23	20	1	15	1	11 – 29
25 – 35	18	17	16	17	17	1	5	0	14 – 20
35 – 45	18	17	17	19	18	1	5	0	15 – 20
45 – 60	20	20	20	19	19	0	1	0	19 – 20
Aeration limit (%) in second stage: after wheat harvest in stubblefield - julie 2007									
0 – 5	31	34	33	32	33	1	4	1	29 – 36
5 – 15	23	26	24	23	24	1	6	1	20 – 28
15 – 25	20	21	20	19	20	1	3	0	18 – 22
25 – 35	21	21	20	21	21	1	3	0	19 – 23
35 – 45	20	19	18	19	19	1	3	0	17 - 21

In relation to the level of accumulation in soil and water availability for plants have been taken into account the following indicators: the wilting coefficient, the total capacity for water, yielding maximum capacity, moisture equivalent and useful water capacity, expressed in weight percentages. The data presented highlights the poor conditions of soil water storage. Thus, apart from the superficial layer, which is more mellow, deep, up to 60 cm, the indicators show the numerical values are reduced, useful water capacity <6% w/w, available water storage capacity of the plant very small .

In the wheat crop in the stationary area, samples were taken to determine gravimetric soil water content in different soil depths. The results shown (as total water reserves in m^3/ha) throughout the determinations, a moderate total reserves to low to supply the plant during the period, improving from may (Table 6).

Table 6

Water content of soil within the perimeter of stationary (m3/ha): P1

Depth (cm)	**Observations Data**											
	05/III	**19/III**	**12/IV**	**16/IV**	**30/IV**	**02/V**	**21/0V**	**04/VI**	**VII**	**VIII**	**IX**	**X**
0-30	912	846	947	810	662	643	948	924	480	940	930	940
30-60	967	941	982	895	757	742	1006	1002	520	1000	1000	1000
60-90	1013	1004	1025	966	918	896	1027	1033	700	1030	1030	1030
90-120	1035	1028	1043	1001	963	951	1045	1054	800	1060	1050	1050
0-120	3927	3819	3997	3672	3298	3232	4026	4013	2500	4030	4010	4020

Just as from the information contained in this table, soil water reserves became low in july compared to previous determinations in may and june. These low values obviously are due to consumption of water by plants especially low rainfall in june and july only 36 mm, 63.8 mm and 54.6 mm respectively and the annual average.

Agrochemical soil characterization

Agrochemical soil characterization was conducted in two stages as the other physical characteristics of the soil after wheat emergence in autumn 2006 and after harvesting wheat stubble in July 2007, the results for these characteristics are presented in table 7. Soil reaction is contained in weak acid (6.0 ... 6.8) without requiring amendment currently under use and correct application of mineral fertilization.

Humus content, in agreement with textural class is low to moderate, which is necessary to improve the technological system of plant production by reducing the intensity of work that facilitates mineralization, by introducing organic fertilization, even placing in protective crop rotations, associates and their incorporation into the soil at the next cycle.

Mobile phosphorus content is very high (being more than 72 mg•kg^{-1}) in the first stage and high in second stage and between medium and high at 25 cm and below this depth. Measurements of the first phase were carried out after applying fertilizer to a short period of time, which explains the high content.

Potassium content, except the superficial layer of soil is quite low, does not ensure a normal supply of crops, especially those with higher demand, such as corn. Potassium deficiency is explained by the fact that he considered the time that the soils in our country are sufficiently rich in this macronutrient, but already in various agricultural areas, studies have shown that soil K supply is inadequate, which would potassic fertilizers requires fertilization.

The nitrogen content was reduced, showing that the supply of plant nutrient is poor, and while possible nutritional imbalances. Mineral fertilization, along with other components of agricultural technology systems for growing plants, remains one of the most important measures to preserve soil fertility and productivity while the use of organic fertilizers, is not practically possible at present because of the extremely small numbers of animals. The introduction of crops that can be used as "green manure"could be seen as a possible solution for increasing organic matter content of such soils, which are potentially fertile native.

Correlations of moderate conservative tillage influence on the physical and chemical properties - total porosity, apparent density, degree of compaction, clay, humus content, in 2007, after harvesting wheat stubble in july – 2007 are presented in follow graphics:

Numerical measures of the degree of compaction above 18% v/v, outlined in two stages that the soil is heavily compacted by applying annual conventional tillage system. Secondary compaction of such soil demand an intense work that requires deep loosening by scarifiying, but at the same time introducing crop rotations with ameliorative plants. Crop rotation was for centuries the most simple solution that any farmer can use to improve soil physical condition. In this direction it is known and appreciated the beneficial effect of culture perennial *Lolium multiflorum, Lotus corniculatus, Dactilis* sp., etc., and various leguminous.

Table 7

Agrochemical characteristics of soil in Banu Mărăcine agricultural area

Depth/ Indicator	Observation profile				Statistics indicators				
	P1	**P2**	**P3**	**P4**	$\overline{X}$	**S**	**Cv**	**S** $\overline{X}$	**IC**
Reaction - pH (H_20) at 1: after wheat emergence. October-2006									
0 – 5	6.22	6.18	6.17	6.20	6.20	0.06	1.40	0.03	6.15 – 6.25
5 – 15	6.23	6.24	6.25	6.21	6.23	0.03	1.18	0.01	6.20 – 6.26
15 – 25	6.37	6.34	6.38	6.33	6.36	0.06	1.43	0.03	6.30 – 6.40
35 – 45	6.78	6.86	6.59	6.78	6.73	0.08	2.41	0.04	6.52 – 6.80
pH (H_20) in step 2: after harvesting wheat stubble in July - 2007									
0 – 5	6.20	6.17	6.13	6.10	6.17	0.08	1.15	0.04	6.00 – 6.25
5 – 15	6.24	6.20	6.28	6.23	6.23	0.22	2.63	0.11	6.18 – 6.30
15 – 25	6.32	6.25	6.33	6.47	6.36	0.26	3.18	0.13	6.20 – 6.60
35 – 45	6.49	6.47	6.53	6.68	6.54	0.09	1.45	0.05	6.37 – 6.72
Humus content (% w / w) at 1: after wheat emergence. October - 2006									
0 – 5	2.44	2.36	2.36	2.33	2.36	0.02	0.50	0.01	2.24 – 2.40
5 – 15	2.05	2.05	2.03	2.05	2.05	0.02	0.49	0.01	2.02 –2.07
15 – 25	1.89	1.67	1.60	1.66	1.71	0.17	15.9	0.07	1.50 – 2.00
35 – 45	1.49	0.86	0.91	1.34	1.15	0.31	17.2	0.16	0.80 – 2.06
Humus content (% w / w) in step 2: after harvesting wheat stubble in July - 2007									
0 – 5	2.38	2.31	2.31	2.32	2.33	0.04	10.95	0.02	2.23 – 2.38
5 – 15	2.03	2.05	2.01	2.08	2.06	0.06	7.76	0.03	2.00 – 2.17
15 – 25	1.69	1.64	1.69	1.67	1.97	0.12	16.17	0.06	1.55 – 1.99
35 – 45	1.37	1.46	1.41	0.91	1.29	0.15	19.75	0.08	0.84 – 1.53
Total nitrogen content (% w / w) at 1: after wheat emergence. October - 2006									
0 – 5	0.144	0.130	0.129	0.158	0.140	0.014	9.75	0.007	0.125-0.180
5 – 15	0.138	0.132	0.120	0.154	0.136	0.014	10.40	0.007	0.110-0.160
15 – 25	0.137	0.124	0.118	0.150	0.132	0.014	10.77	0.007	0.110-0.160
35 – 45	0.125	0.130	0.115	0.130	0.125	0.018	14.24	0.009	0.110-0.150
Total nitrogen content (% w / w) in step 2: after harvesting wheat stubble in July - 2007									
0 – 5	0.214	0.250	0.299	0.236	0.250	0.036	14.423	0.018	0.145 – 0.355
5 – 15	0.109	0.124	0.166	0.152	0.138	0.026	18.822	0.013	0.062 – 0.213
15 – 25	0.103	0.103	0.112	0.093	0.103	0.008	7.554	0.004	0.080 – 0.125
35 – 45	0.097	0.102	0.103	0.094	0.099	0.004	4.285	0.002	0.087 – 0.111
Mobile phosphorus content ($mg.kg^{-1}$) at 1: after emergence of wheat-October 2006									
0 – 5	85	93	84	83	86	4	5	2	74 – 98
5 – 15	80	78	82	82	81	2	2	1	75 – 86
15 – 25	46	46	54	50	49	4	8	1	38 – 60
35 – 45	14	15	16	13	15	2	9	1	11 – 18
Mobile Phosphorus content ($mg.kg^{-1}$) Stage 2. Stubb after harvesting wheat in July - 2007									
0 – 5	35	38	36	38	37	2	4	1	32 – 41
5 – 15	33	38	38	35	36	2	7	1	29 – 43
15 – 25	31	30	33	34	32	2	6	1	27 – 37
35 – 45	14	15	18	15	16	2	8	1	12 - 20
Mobile potassium content (Km. $mg.kg^{-1}$) at 1: after wheat emergence - October 2006									
0 – 5	175	180	178	180	178	8	5	4	165 – 190
5 – 15	114	118	118	114	116	10	18	5	100 – 130
15 – 25	88	82	80	90	85	12	18	6	73 – 98
35 – 45	80	64	62	80	72	10	12	5	55 – 90
Mobile potassium content (Km. $mg.kg^{-1}$) at 1: after harvesting wheat. the stubble-July 2007									
0 – 5	172	184	180	178	179	8	19	4	165 – 1908
5 – 15	116	114	116	114	115	10	25	5	108 – 120
15 – 25	80	96	82	96	86	10	22	5	77 – 105
35 – 45	80	80	96	96	88	9	10	5	71 - 105

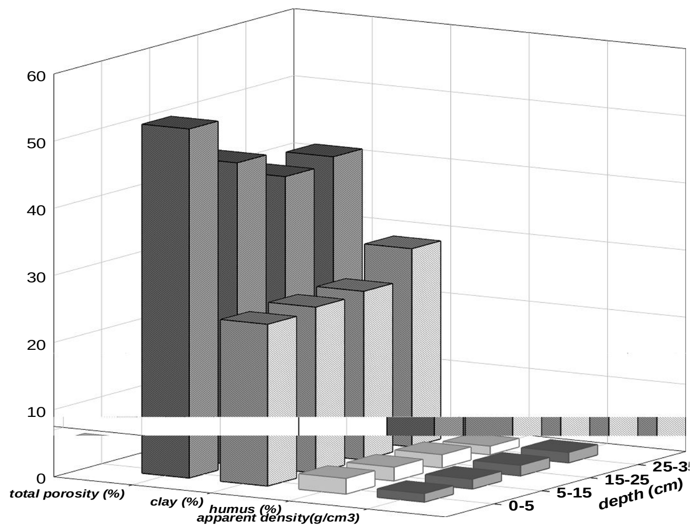

Figure 1: Variation function of depth for median content of humus, clay, apparent density and porosity after harvesting wheat stubble in July – 2007, stage 2.

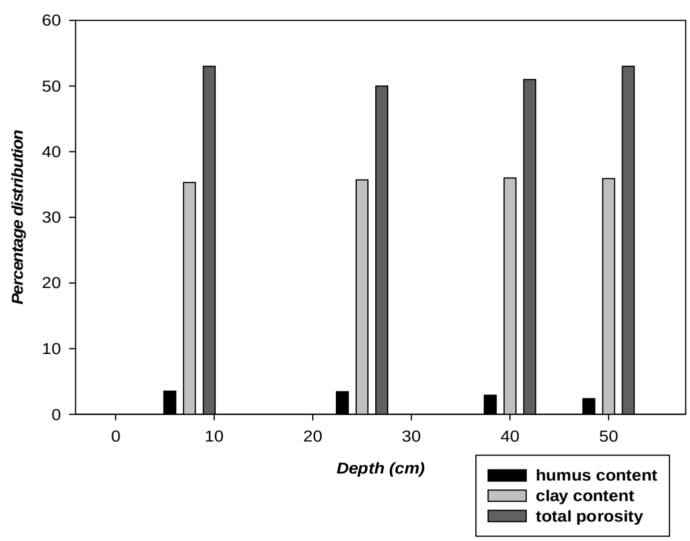

Figure 2: Variation function of depth for median content of humus, clay and porosity after harvesting wheat stubble in July – 2007, stage 2.

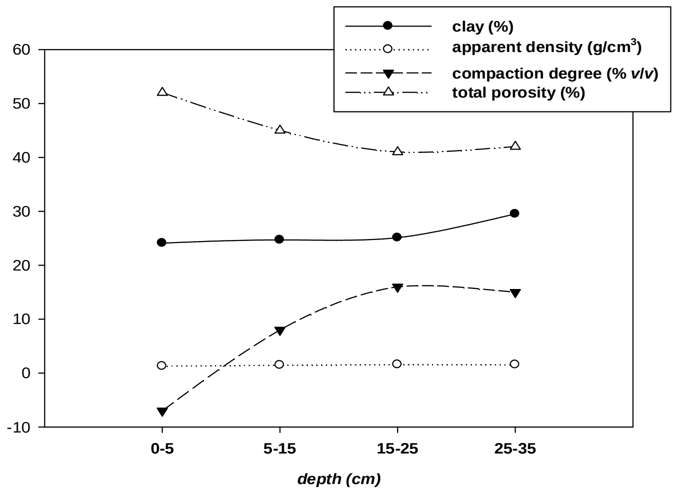

Figure 3: Variation function of depth for median content of clay, apparent density, compaction degree and porosity after harvesting wheat stubble in July – 2007, stage 2.

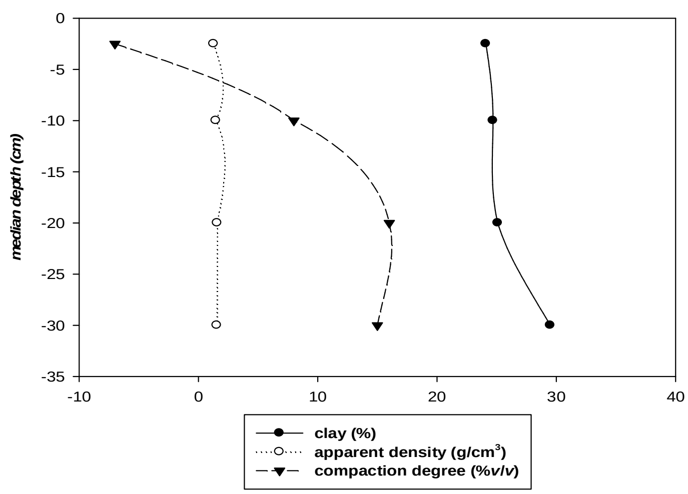

Figure 4: Variation function of depth for median content of clay, apparent density, compaction degree after harvesting wheat stubble in July – 2007, stage 2.

CONCLUSIONS

Granulometric composition of the soil is medium size, predominantly in a ratio of about 80% content of dust, fine sand and coarse fractions active in the training process, aggregation or aggregate formation and stabilization of the structure, which makes the soil to have a high susceptibility to physical degradation by dissolution, and consequently to crustification and compaction; size composition, the low content of clay, give to this soil suitability for conservative technology systems;

Compactness, assessed by two parameters, density and degree of compaction, highlights the immediate negative residual effects of conventional soil tillage, especially in the first stage, but the numerical values remain high in both stages, numerical values exceeding 18% v / v the degree of compaction. This shows that anthropogenic compaction in the soil profile is present and very intense so that makes it necessary to improve the physical condition of the soil by applying scarification, as an immediate solution. Also, to protect the status and quality of soil fertility requires all operations and intervention on the soil to be made only in the optimum condition of moisture, through the conditions of work ability and avoid future traficability, because can increase physical soil degradation. Also, axle load of farm machinery as well as tire pressure must be adequate to prevent the penetration in depth of anthropogenic or secondary compaction;

Potential of aeration conditions are in agreement with the state of compactness, so that the soil conditions are not appropriate, nor for the normal processes of aeration, or for storage and accumulation of plant available water reserve, porosity occupying very little useful below 10% v/v, while inactive porosity increases;

Water storage capacity, particularly those available is reduced, due to high fractions, determinated by the content of inactive fraction, by intense soil compactness, by low organic matter content in soil, therefore, measures are needed to improve agrotehnical measures, for physical properties improve and reserve storage capacity of water, especially those accessible to crops, not only by mechanical action, but also conservative: loosening soil without turning furrow, placing natural organic fertilizers;

Soil permeability to water, the depth is reduced because it is consistent with the state of compactness which require the same measures to improve physical soil properties;

Structural stability of aggregates to water is reduced, showing that the soil has susceptibility to physical degradation by dissolution, so that, especially at the beginning of the growing season after sowing.

Agrochemical is moderately to good condition, the reaction is slightly acide, requiring careful to stress, that the risk will rely on fertilization with N; P content is related to provision, which shows that in the past been applied in sufficient quantity fertilizers that contain this nutrient; the K content is low, requiring the introduction of fertilization plans.

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