

CONSIDERATIONS ON THE CERNISOILS FROM THE CENTRAL EASTERN PART OF THE SOUTHERN BĂRĂGAN

CONSIDERAȚII ASUPRA UNOR CERNISOLURI DIN PARTEA CENTRAL- ESTICĂ A BĂRĂGANULUI SUDIC

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Abstract: *The knowing of the cernisoils characteristics from the Central-Eastern Part of the Southern Bărăgan has theoretical importance and practical one because it provide to the farmers data on the rational use of land fund. The research has been conducted on cernisoils from two administrative territorial perimeters: Dragalina and Ștefan cel Mare. In this study were identified several types of chernozem and faeozem. The soils from studied perimeters were formed exclusively on loess, under the influence of plant association grassy steppe conditions of temperature and humidity typical of continental temperate climate. With every soil unit there are presented the physic chemical features on whose basis there are made the recommendations for practiced of durable and effective agriculture.*

Rezumat: *Cunoașterea caracteristicilor cernisolurilor din partea central-estică a Bărăganului Sudic prezintă importanță teoretică și practică, deoarece pune la dispoziția specialiștilor din agricultură date privind utilizarea rațională a fondului funciar. Cercetările s-au efectuat asupra cernisolurilor din două perimetre teritorial administrative: Dragalina și Ștefan cel Mare. Au fost identificate mai multe tipuri de cernoziom și faeoziom. Solurile din perimetrele studiate s-au format în exclusivitate pe loess, sub influența asociației vegetale ierboase de stepă în condiții de temperatură și umiditate caracteristice climatului temperat continental. La fiecare unitate de sol sunt prezentate principalele proprietăți fizico-chimice pe baza cărora se fac recomandări în vederea practicării unei agriculturi durabile și eficiente.*

Key words: *cernisoil, loess, Southern Bărăgan*
Cuvinte cheie: *cernisol, loess, Bărăganul Sudic*

INTRODUCTION

In Bărăgan Southern Plain, the soil is the main natural resource. Most of its surface is covered by soils with a high fertility.

In the Central-Eastern Part is remarkable homogeneity of a wide range of soil, most of the area being occupied by cernisoils.

Because of parental material, which is composed mostly of surface deposits of loess and loess, coating of plain soil is relatively homogeneous, both in terms of soil profile thickness and the types of soil, most of cernisoils class.

MATERIAL AND METHODS

Across the sector plain the cernisoils occupies more than 90% of the area being represented by several types.

The research study has been conducted on cernisoils from two administrative territorial perimeters: Dragalina and Ștefan cel Mare. In this study were identified several types of chernozem and faeozem.

The soils from studied perimeters were formed exclusively on loess, under the influence of plant association grassy steppe conditions of temperature and humidity typical of temperate continental climate.

Pedological studies it has made in conformity with „Pedological studies elaboration methodology” made by ICPA – Bucharest, and soils type was established in conformity with „Romanian system of soils taxonomy – 2003”.

RESULTS AND DISCUSSIONS

Basic factors that contributed to the formation of soils are micro relief, climate, parental material, vegetation and groundwater. On the territory investigated, although the large expanse that was bounded by several units of ground because of invariability pedogenetic factors in the area studied.

Parent material on which soils are formed is loess, that prints high soil fertility, deep with good drainage and a medium texture.

The soils of the administrative territories Dragalina and Ștefan cel Mare fall cernisoil class with types and subtypes characteristic, and most have epycalcaric chernozem, proxycalcaric chernozem, mezocalcaric cambic chernozem, faeozem.

Epycalcaric chernozem occupy a high share in the administrative territory perimeter of Dragalina, 4906 ha (30%), the sequence of horizons is the Am-AC-Ck-Cca and has the following characteristics:

Am horizon (0-34 cm) is clayey, dark brown closed, disturbed structure in the first 20 cm, glomerular well-developed below 20 cm, wet, common roots thin, medium plastic, adhesive medium, medium pores, without tumult, gradual transition in next horizon.

AC horizon (34-53 cm) is yellowish brown with brown spots closed, poorly structured, clayey, wet, moderately compact, settled, small pores, moderate effervescences, CaCO₃ in the form of efflorescence and pseudo micelles, gradual shift in the next horizon.

Ck horizon (53-73 cm) is clayey, yellow brown, unstructured, dry, friable tough, strong effervescence, CaCO₃ as pseudomicelles.

Cca horizon (73-108 cm) is clayey, whitish yellow, without structure, rough dry, ferment violent, CaCO₃ in the form of concretion friable small, rigid and friable powder.

Soil reaction within the first 20 cm is weakly alkaline (pH = 7.5), humus content is good (H = 3.0%), the supply of mobile phosphorus is average (31 ppm) and potassium mobile is good (204 ppm). CaCO₃ ranges 2.6-12.4% per profile.

Texture in the upper horizon is clayey, clay below 0.002 mm - 32.1%. (table 1)

In perimeter of Ștefan cel Mare, epycalcaric chernozem occupies 410 ha (20%), the sequence of horizons is the Am-AC-Ck-Cca and has the following characteristics:

Am horizon (0-35 cm) is clayey, brown dark, glomerular structure and low average, wet, thin roots, moderately compact, medium and plastic adhesive in wet, do ferment between 15-30 cm, gradual transition.

AC horizon (35-55 cm) is clayey, yellowish brown, poorly developed glomerular structure, moderately compact, rooted rare, medium and plastic adhesive in wet, average effervescence, gradual transition.

Ck horizon (55-75 cm) is clayey, yellowish brown, without structure, moderately compact, dry, with abundant efflorescence, porous, smooth transition.

Cca horizon (75-115 cm) is clayey, whitish yellow, without structure, dry, porous, moderately compact, with abundant efflorescence and concrete semi friable very much.

Soil reaction within the first 20 cm is weak acid (pH = 6.8), humus content is medium (H% = 4.0-4.5), the supply of mobile phosphorus is good (54 ppm) and potassium mobile is all good (188 ppm). CaCO₃ in the first 50 cm is 1.2-3.5%.

The texture is undifferentiated profile - clayey (table 1).

Proxycalcaric Chernozem occupies the largest share in the administrative territory perimeter of Ștefan cel Mare, 1374 ha (67%), the sequence of horizons is the Am-AC-Ck-Cca

and has the following characteristics:

Table 1

The main chemical properties of epycalcaric chernozem

Administrative territorial perimeter	Area (ha)	pH	Humus (%)	P mobile (ppm)	K mobile (ppm)	CaCO ₃ (%)
<i>Dragalina</i>	4906	7.5	3.0	31	204	2.6-12.4
<i>Ștefan cel Mare</i>	410	6.8	4.0-4.5	54	188	1.2-3.5

Am horizon (0-32 cm) is clayey, dark browns, glomerular small and medium dry, rooted hair, moderate settled, medium and plastic adhesive in wet, do effervescence strong on the surface of the soil, porous, smooth transition.

AC horizon (32-58 cm) is brown, glomerular small, poorly developed, clayey, dry, moderately compact, rooted hair, rare, porous, efflorescence abundant limestone and gradual transition.

Ck horizon (58-80 cm) is clayey, yellowish brown, without structure, moderately compact, dry, strong effervescence, CaCO₃ in the form of efflorescence.

Cca horizon (80-110 cm) is clayey, dirty yellow, with no structure, dry, porous, moderately compact, concretion with CaCO₃ semi friable frequent, gradual transition.

Soil reaction within the first 20 cm is weakly alkaline (pH = 7.2-7.8), humus content is medium (H% = 2.2-2.8), the supply of mobile phosphorus is average (36 ppm) and potassium mobile is good (180 ppm). CaCO₃ in the first 50 cm is 3.4-3.5%.

Texture is clayey-argillaceous on 0-58 cm and clayey in depth profile. (table 2)

In the perimeter of Dragalina, proxycalcaric chernozem, occupies 6567 ha (39% of the territory), the sequence of horizons is Ap-Am-AC-Cca and has the following characteristics:

Ap horizon (0-20 cm) is clayey, brown closed structure disturbed by mechanical work, light, sensitive pores, common roots thin, dry, weak effervescence.

Am horizon (20-38 cm) is clayey, brown dark, glomerular structure, small and medium moderately developed, dry, thin roots, settled, rough dry, sensitive pores, coprolites, moderate effervescence, CaCO₃ in the form of spots on the horizon, winding passage in the next horizon.

AC horizon (38-56 cm) is yellowish brown, small grained structure, poorly developed, clayey, friable hard, dry, CaCO₃ in the form of powder and vines friable, weak plastic and weak adhesive, gradual shift in the next horizon.

Cca horizon (56-105 cm) is clayey, whitish yellow, without structure, dried, ferment violent, CaCO₃ in the form of friable concretion and friable powder.

Soil reaction within the first 20 cm is weakly alkaline (pH = 7.9), humus content is good (H = 3.6%), the supply of mobile phosphorus is average (38 ppm) and potassium mobile is good (120 ppm). CaCO₃ ranges 8.2-12.3% per profile.

Texture throughout the profile is clayey, clay below 0.002 mm - 30.5% in 0-20 cm (table 2).

Table 2

The main chemical properties of proxycalcaric chernozem

Administrative territorial perimeter	Area (ha)	pH	Humus (%)	P mobile (ppm)	K mobile (ppm)	CaCO ₃ (%)
<i>Dragalina</i>	6567	7.9	3.6	38	120	8.2-12.3
<i>Ștefan cel Mare</i>	1374	7.2-7.8	2.2-2.8	36	180	3.3-4.5

Mezocalcaric cambic chernozem occupies an area of 816 ha in the perimeter of Dragalina (5%) and 68 ha in the perimeter of Ștefan cel Mare (3%).

Sequence of horizons in the perimeter of Dragalina is Am-Bv-BC-Ck and has the following characteristics:

Am horizon (0-38 cm) is clayey, the small grained, partially destroyed during the first 20 cm, moderately developed below 20 cm, moderately compact, friable hard, small pores, moderately plastic and adhesive, thin roots and frequent, clear passage.

Bv horizon (38-60 cm) is clayey-dusty, yellowish brown, polyhedral structure and grained, wet, low compact, friable, small pores, passing gradually into the next horizon.

BC horizon (60-106 cm) is clayey-dusty, yellow brown mottled, brown spots dark, poorly structured friable, moderately plastic and adhesive, effervescence poor, gradual transition.

Ck horizon (107-111 cm) is clayey, yellow-looking whitish, without structure, moist, friable hard, weak plastic and weak adhesive, strong effervescence.

Soil reaction within the first 20 cm is weak acid (pH = 6.7), humus content is low (H = 2.8%), the supply of mobile phosphorus is average (39 ppm) and potassium mobile is good (170 ppm).

Texture is clayey the upper horizon. (table 3)

Sequence of horizons within the perimeter of Ștefan cel Mare is Ap-AB-Bv-BC-Cca and has the following characteristics:

Ap horizon (0-31 cm) is clayey, brown dark, structure partially destroyed due to mechanical work, medium and plastic adhesive in wet, dry, medium compact, does not ferment, clear passage.

Ap horizon (31-40 cm) is clayey, brown, glomerular small and medium, moderately compact, medium and plastic adhesive in wet, average and large glomerular structure, porous medium, does not ferment, gradual transition.

AB horizon (40-60 cm) is clayey, brown, glomerular small and medium dry, moderately compact, thin roots and rare, gradual transition.

Bv horizon (60-90 cm) is clayey-argillaceous, closed yellowish brown, polyhedral structure, moderately compact, thin roots and rare, medium and plastic adhesive in wet, gradual transition.

BC horizon (90-102 cm) is clayey-argillaceous, yellowish brown, poorly structured, weakly compact, medium and plastic adhesive in wet, efflorescence of CaCO₃, gradual transition.

Cca horizon (102-130 cm) is clayey, yellowish, without structure, wet, medium and plastic adhesive in wet, concretion rigid of CaCO₃.

Soil reaction within the first 20 cm is weakly alkaline (pH = 7.3), humus content is medium (H% = 3.8-4.0), the supply of mobile phosphorus is average (22 ppm) and potassium mobile is very good (264 ppm).

Texture is clayey on 0-60 cm and clayey-argillaceous to profile down (table 3).

Table 3

The main chemical properties of mezocalcaric cambic chernozem

Administrative territorial perimeter	Area (ha)	pH	Humus (%)	P mobile (ppm)	K mobile (ppm)
<i>Dragalina</i>	816	6.7	2.8	39	170
<i>Ștefan cel Mare</i>	68	7.3	3.8-4.0	22	264

Faeozems occupies low areas, 1430 ha in the perimeter of Dragalina (8.5%) and 247 ha in the perimeter of Ștefan cel Mare (10%).

Sequence of horizons in the perimeter of Dragalina is Am-AB-Bv-BC-C and has the following characteristics:

Am horizon (0-45 cm) is clayey-argillaceous, blackish brown in wet, granular structure, moderately well-developed, moderately compact, thin roots, common, small pores, wet, gradual shift in the next horizon.

AB horizon (45-67 cm) is clayey-argillaceous, dark grey brown, slightly yellowish, moderate glomerular structure developed, moist, moderately compact, friable in wet, moderately plastic and moderately adhesive, small pores.

Bv horizon (68-88 cm) is clayey-argillaceous, yellowish brown, polyhedral structure, moist, friable, gradual shift in the next horizon.

BC horizon (89-105 cm) is clayey-argillaceous, yellowish brown with dark gray spots open, poorly developed structure, moist, friable, moderately plastic and moderately adhesive, small pores, gradual shift in the next horizon.

C horizon (106-162 cm) is clayey-dusty, yellow brown, unstructured, moist, medium plastic and adhesive, makes effervescence.

Texture in the upper horizon is clayey-argillaceous, undifferentiated on profile. Soil reaction within the first 20 cm is weak acid (pH = 6.5), humus content is average (H = 3.5%), the supply of mobile phosphorus is average (34 ppm) and potassium mobile is very good (352 ppm) (table 4).

Table 4

The main chemical properties of cambic faeozem

Administrative territorial perimeter	Area (ha)	pH	Humus (%)	P mobile (ppm)	K mobile (ppm)
<i>Dragalina</i>	1430	6.5	3.5	34	352
<i>Ștefan cel Mare</i>	247	7.8	3.8	35	312

Sequence of horizons within the perimeter of Ștefan cel Mare Am-AB-Bv-BC-C and has the following characteristics:

Am horizon (0-40 cm) is clayey-argillaceous, dark, small and medium glomerular, good adhesive and plastic in wet, moist, weak compact roots, clear passage.

AB horizon (40-60 cm) is clayey-argillaceous, brown dark, glomerular small, medium compact, roots, medium and plastic adhesive in wet, gradual transition.

Bv horizon (60-98 cm) is clayey-argillaceous, dark yellowish brown, polyhedral structure, dry, moderately compact, roots thin, medium plastic and adhesive in wet, gradual transition.

BC horizon (98-125 cm) is clayey-argillaceous, yellowish brown, slightly wet, weak compact, rare roots, medium plastic and adhesive in wet, polyhedral structure, poorly developed, smooth transition.

C horizon (below 125 cm) is clayey-argillaceous, yellow, without structure, wet, loose, rare roots, medium plastic and adhesive in wet, do not ferment.

Soil reaction within the first 20 cm is weakly alkaline (pH = 7.8), humus content is average (H = 3.9%), the supply of mobile phosphorus is average (35 ppm) and potassium mobile is very good (312 ppm). Texture is undifferentiated on profile - clayey-argillaceous (table 4).

CONCLUSIONS

Soils studied from administrative territorial perimeters were formed exclusively on loess, under the influence of plant association grassy steppe conditions of temperature and humidity, characteristics of a temperate continental climate.

Under the influence of water from rainfall is the levigation salts such as CaCO₃.

In conditions of microrelief existing on flat surfaces, slightly positive, its presence on the ground, in case of proxycalcaric chernozem, or at depths of 20-50 cm in case of epycalcaric chernozem. Area slightly depression, were formed cambic chernozem with levigation carbonates between 50-100 cm.

Parent material on which soils are formed as the loess which print high soil fertility, deep with good drainage and a medium texture.

Sequence of horizons is the Am-AC-C-Cca for calcaric chernozem and AB-Bv-BC-Cca for cambic chernozem. Faeozem has the same profile as cambic chernozem. It are not calcium carbonates than 125 cm below the soil and are acquiring physico-chemical and good trophicity.

Am horizon, pale brown, clayey, with texture glomerular partially destroyed due to mechanical work the horizon is crossed by plant roots, which must meet the qualities of a fertile soil, good worked, aerate.

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