MORPHOLOGICAL STRUCTURE, HUMUS CONTENT OF THE SOILS WITH DIFFERENT DEGREE OF EROSION IN THE RECEPTION BASIN „NEGREA" HINCESTI DISTRICT AND THEIR ACTION ON THE EROSION PROCESS FROM REPUBLIC OF MOLDOVA

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Abstract

In conditions of Moldova, with the complicated geomorphological structure, one of the processes that have caused and causes deterioration in the present intensive soil cover, the default ambient environment is soil erosion. Critical level of soils humification of Moldova show off preserving and the increase of humus content, first of all, in soils affected by erosion. Purpose of the study was to evaluate the morphological structure and humus content of the soils with different degree of erosion from reception basin "Negrea" carried out based on the data of the six principal soil profiles. The data obtained confirmed that catchment erosion territory "Negrea" is the main factor irrecoverable destruction of agricultural soil profile and reduced their production capacity. Soil is the main natural resource of the Republic of Moldova on which her food security, economic potential and welfare of the people. In general, we emphasize that soil erosion is the most urgent, the most acute and even the most threatening problem. Of the mentioned we consider that, in conditions of Moldova, erosion control is decisive in diminishing measure of soil degradation process. Aim of the researches envisaged was in highlighting the particularities genetic, assessment of negative modifications soil characteristics of the reception basin in the erosion result of erosion and appreciation of quality of the different agricultural use. According to the research carried out it was found that the soil cover of reception basin "Negrea" is exemplification of unity durable of the interaction soil, vegetation, environment and man in a one hilly region. The conservation reserves of humus are vital to Moldova's agriculture.

Key words: Erosion, Humus content, Morphological composition, Reception basin, Soil profile.

Soil is the main natural resource of the Republic of Moldova on which her food security, economic potential and welfare of the people (Nor D., Balteanschi D., 2004). In general, we emphasize that soil erosion is the most urgent, the most acute and even the most threatening problem. Of the mentioned we consider that, in conditions of Moldova, erosion control is decisive in diminishing measure of soil degradation process. *Humus* is the main index of soil fertility. As a result of microbial activity, humus is mineralized slowly releasing nitrogen, phosphorus, sulfur and other elements (Andries S., Tiganoc V., Leah N. et al., 2007).

Aim of the researches envisaged was in highlighting the particularities genetic, assessment of negative modifications soil characteristics of the reception basin in the erosion result of erosion and appreciation of quality of the different agricultural use. According to the research carried out it was found that the soil cover of reception basin "Negrea" is exemplification of unity durable of the interaction soil, vegetation, environment and man in a one hilly region. The reception basin "Negrea", is situated on the plain of the Middle Prut within the limits the estate the „Negrea" community, district Hincesti being part of the accumulation basin Lapusnita rivulet, left tributary of the river Prut. The object of study occupies the north-east and middle agricultural territory of the village of New Negrea.

MATERIAL AND METHOD

The conservation reserves of *humus* are vital to Moldova's agriculture (Andries S., Tiganoc V., Leah N. et al., 2007), so the determination of humus is carried out in all soil samples taken. The carbon cycle plays a decisive role in the global environmental changes, to which the rest of the elements` cycles are closely linked and in the climate change. The diversity of natural conditions of soil formation and their interaction with anthropogenic factors have led to the formation of reception basin territory "Negrea" a soil cover variable and complex character. Morphological description of the profiles was performed and was

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developed soils map obtained from 1:5000 scale mapping, which demonstrate spatial distribution of soils with different degree of erosion. The reception basin "Negrea" located in the middle basin of the rivulet Lapusnita and is typical for all catchments fully formed as a result of erosion of the high terraces fragmentation of Prut River and its left tributaries. The location and the description of morphological detailed, morphometric determination of indicators reception basin soils "Negrea" was made based on data obtained for the six main soil profiles: the profile Nr.1. Not eroded chernozem ordinary; the profile Nr.3. Poorly eroded ordinary chernozem; the profile Nr.6. Moderately eroded ordinary chernozem; the profile Nr.4. Strong eroded ordinary chernozem; the profile Nr.15. Cumulative chernozem izohumic; the profile Nr.10. Sol typical cumulative.

Methods for conducting research and analysis of soil in the field included: detailed mapping of soil cover reception basin at the scale 1:5000 as instructed in force; location and morphological description of the soil profiles, the determination of morphometric indices of soil, soil sampling for laboratory analysis; determine the extent of soil erosion slopped in the reception basin the based on data summary thickness humiferous of profile with higher humus content of 1.00%, etc. Comparative characteristic parameters investigated soil gave possibility to recommend measures necessary for diminishing the negative impact of erosion.

RESULTS AND DISCUSSION

In the process of carrying out soil studies it was found that soil erosion affects an extremely large on the status of humus, reducing, depending on the degree of manifestation, humus and of nitrogen reserves in the soil naturally, their depth. Only one catastrophic downpour caused in a short time, is powerless to wash the slope a quantity of humus accumulation that nature he needed centuries or even millennia (Florea N. et al., 1987). Soils on the slopes are affected by denudation and evolve through pedogenesis denudational - compensation, meaning that the relatively long period that occurs slowly denudation processes, there is a certain development of soil depth, thus compensating pedogenesis - at least partially – denudation (Nor D., Balteanschi D., 2004). The exception is if there is an accelerated erosion of soil due to anthropogenic inappropriate works, where massive loss of soil through erosion cannot be compensated by process of pedogenesis. These two cases are present on the reception basin "Negrea".

First case. Use of land under perennial plantings and unclog led to the return of land surface soil humus horizons underlying the weak initially eroded. Also surface humus horizons they were buried 30-50 cm depth in this respect is preserved on the possibility of being further destroyed by erosion. Formation of micro terraces between rows in vineyards and orchards, grassing space between trees in orchards led to decrease erosion. As a result, intensified processes of accumulation of organic matter in the former underlying the weak humus horizons, returned to the surface by subsoiling.

The second case. Fields in central reception basin vineyards and orchards about 20 years ago were cleared and arable land included. Under the influence of this action anthropogenic the erosion processes intensified, fertile soil losses have increased. So, as a result of recent deforestation vineyards and orchards old plantations and arable land crossing is expected to sharply increase erosion reception basin territory. Not erodate soils are spread only to summit quasi horizontal surface (inclination about 1˚). These soils are used as a yardstick to determine the extent of soil erosion on slopes by comparing the thickness of humiferous profile of eroded soils with the thickness humiferous profile – yardstick not erodate. Reserves of humus in soil erosion compared to the normal profile (complete) gets their quantitative characteristics.

The information on the morphological composition and the content of humus horizons in the six main profiles of soil is as follows:

***Profile Nr.1*,** not eroded chernozem ordinary is characterized by profile type: **Ahp1→ →Ahp2→Ahb→Bh1→Bh2k→BCk1→BCk2.** Layer thickness of humiferous profile on humus content greater than 1% - 92 cm. Features: the existence of a horizon of 20-35 cm after arable powerful compact, which prevents the spread deep roots and reduces water permeability.

Profile Nr.3, poorly eroded ordinary chernozem is characterized by profile type: **Ahp1→Ahp2→Ahb→BCk→Ck** with layer thickness of humiferous profile on humus content greater than 1 % - 75 cm. Features: existence of a horizon of 20-35 cm after arable very strong compact, which prevents the spread deep roots and contribute to erosion.

Profile Nr.6, moderately eroded ordinary chernozem is characterized by profile type: **ABhp1→ABhb2→BCk1→BCk2** with layer thickness of humiferous profile on humus content greater than 1% - 48 cm.

Profile Nr.4, strong eroded ordinary chernozem is characterized by profile type: **Bhp1→Bhb2→BCk1→BCk2→BCk2** with layer thickness of humiferous profile on humus content greater than 1% - 40 cm.

Profile Nr.15, Cumulative chernozem izohumic is characterized by profile type: **Ahp1→Ahp2→Ahb→Bh1→Bh2k →BCk** with

layer thickness of humiferous profile on humus content greater than 1% - 135 cm.

Profile Nr.10, Sol typical cumulative arable is characterized by profile type:

Ihp→IIh→IIIh→IVh→Ahb→Bhb→Bhb 1→ →Bhb2→BC with layer thickness of humiferous profile on humus content greater than 1% - 220 cm. All profiles are observed reversing initial genetic horizons.

Soil material (*pedolit*), washed down slopes, in valleys accumulates and forms cumulative soils. Humus content in arable layer of chernozem cumulative izohumic (Turcanu M., Banaru A. et al., 1994) varies between 3.00-3.40% and slowly decreases in depth. Chernozem izohumic cumulative occupies small the foot of slopes. Were formed as a result of slow accumulation of fine material and humiferous of soil (pedolit), washed down slopes. The profile of chernozems ordinary izohumic cumulative differs from that of ordinary chernozems not erodate by a greater thickness of genetic horizons and humiferous profile in full and often with a higher content of humus. The average thickness of humiferous profile of these soils is less than 120 cm, but sometimes reaches 150 cm. Chernozem izohumic cumulative after qualities are the most fertile soils in the fields investigated. It is characterized by a more favorable moisture regime and are rich in humus and nutrients than soils eroded (Cerbari V., 2010).

Typical cumulative soils formed in pedolit recent sediments are under moderate humus content in arable layer of humiferous profile vary within 2.40-2.70%. Under the layer of pedolit recently cumulative sediment is buried a soil black color izohumic containing about 3.4-3.5% humus horizon Ahb buried. Not erodate soils, slightly eroded and cumulative izohumice after humus content is classified as moderately humiferous with trend passage under moderate humiferous in the outcome of perennial plantations deforestation and their use in arable plowed land slightly eroded soils observed an increase in erosion processes and dehumification. These data are necessary not only for the elimination of the phenomenon of erosion, but also for the proper evaluation productivity of eroded soils and selection protective measures and restoring their (Nor D., Balteanschi D., 2004). The reaction soils not erodate often and the low eroded and cumulative izohumic is neutral for horizons Ah and Bh1 (pH=6.9-7.2) and weak alkaline for horizons Bh2, BC and C. Soils moderately strong and very highly eroded, and soils typical cumulative is characterized by weak alkaline reaction on the surface. Within the limits reception basin soil reaction is not limiting factor for field crops. Mobile potassium content of soils arable layer investigated range from 25-38 mg/100g soil not erodate and weakly eroded soils and 17-20 mg/100g soil moderately and strongly eroded soils. Finally it can be concluded that reception basin the soils erosion have lost at 20 until 60-80% from thickness profile of humiferous, humus content in arable layer of their was reduced from 3.00-4.00% not erodate and weakly eroded soils till 1.00-2.00% strong and very strong soils eroded.

CONCLUSIONS

For the correct and rational measures to protect the soil from erosion is necessary to know its causes, natural and anthropogenic regularities of manifestation and development, territorial expansion, dividing the types and degrees.

Diversity of conditions the terrain, rock, and agricultural use, determines formation reception basin territory "Negrea" of a coating variable and complex soils the composition of which predominates usual chernozem with varying degrees of erosion (83%). The increase of the degree of soil erosion leads to the decrease concomitantly the content of humus, nutrients and their production capacity. Note weighted average of creditworthiness of agricultural land in the reception basin it is now equal to 55 points, the soil cover is generally characterized by a medium productivity. Grubbing of perennial plantations gives rise to increased erosion on arable further used. Parallel with grubbing of perennial plantations is necessary to convert anti-erosion land already used in arable and conducted monitoring erosion processes in order to prevent accelerating the deterioration of the soil cover.

Providing a systematic control is necessary for all forms of degradation that lead to triggering soil erosion.

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