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SOILS OF THE REPUBLIC OF MOLDOVA: BASIC STAGES OF STUDY, CURRENT STATUS AND TRENDS OF EVOLUTION

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ABSTRACT

Soil science in its classical form appeared recently, about 140 years ago, with the publication of the book "Russian chernozem" ("Русский чернозем") in 1883, published by the founder of soil genetic science, Vasile V. Dokuchaev. But, the characteristic of the soils of our territory is first described in the works of the "father of history" Herodotus. From the ancient period to the present, the interest in soils has increased, because soil has always been the main determinant of the existence and human community development. The welfare of the people who settled on a certain territory depended on the degree of soil fertility. The stages of soil study show the main scientific achievements of a certain historical period. The scientific results obtained were made possible only by constant work on the soil study as a multifunctional natural object, ecosystemic base, source and space of the economy and as a means of production in agriculture. The next stage of soil study should be carried out at a higher level, using new information and technologies, concepts and modern opinions for this.

Key words: chernozem, degradation, evolution, soil science, stages of soil study.

Introduction

The chernozemic soils on the territory of Moldova represent the most important object for the most comprehensive geographic, genetic, cartographic, hydrological, chemical and geochemical, biological, agrochemical and agrotechnical research, and also represent an important object of intensive agricultural use. The Moldovan chernozems, together with chernozems of the North Caucasus and Danube regions of Western Europe form a special family, or facies, in a wide soils formation system of chernozem type, so characteristic for steppe, forest-steppe and prairie regions of Eurasia and North America (5).

Until recently, it was believed that the history of scientific ideas about the soil cover and other natural conditions of Moldova does not deserve much attention, since it is exhausted by a small number of names, studies and facts. However, a deeper study of literary sources shows that this is not so. The roots of soil science originate in ancient times. This science appeared simultaneously with the birth of agriculture, already in the 3rd millennium BC initial knowledge was gathered about the soil, its properties, and methods of it processing (9).

Materials and methods

On this topic, the theoretical method was used, which consists in the study and generalization of literary sources in the historical aspect.

Basically, the published works of the outstanding soil scientist, doctor of geographical sciences, professor I.A. Krupenikov, who stood at the origins of modern soil science in Moldova, were analyzed. Summarizing the factual material on soils, it was possible to identify the main stages of soil study, the current state and direction of evolution, and to efficiently outline the ways of their rational use and protection.

Results and discussions

I. Main stages of Moldovan soils study (5, 6, 8, 9)

1. From ancient times to Cantemir (beginning of the 18th century). The earliest information about our region dates back to the time of Herodotus. Already in antiquity (Herodotus) the steppe regions of Moldova and Ukraine were described as plain, treeless, “with deep soil”. The “General plan” of the steppes and forests on the territory of Moldova has long been formed in the form in which we know it now, although the forest area was, of course, larger. In the middle of the century, the agricultural development of Moldova was significant, and many soils were used for grains, vineyards and orchards. By the 16th-18th centuries, Moldova was satisfactorily depicted on geographical maps showing forests, steppes, main rivers and cities on them.

2. Dimitry Cantemir on the nature and economy of Moldova. The general meanings of the Cantemir “Descriptio Moldaviae” (“Description of Moldova”) in the history of physical and geographical studies are as follows: the first schematic representations of the topography and climate of the region are given, a lot of information about rivers, their use, and partly the mode; the forests are described, their borders are shown quite accurately at the beginning of the 18th century, on the basis of which one can judge the distribution of forests and steppes in that period; high soil fertility

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was emphasized, their importance as the most important wealth of the region was noted, was provided the information on distribution of grain crops, vineyards, orchards, vegetable gardens. Moldova was first identified as a natural region with its inherent physical, geographical and economic features.

3. From Cantemir to accession of Bessarabia to Russia. In the 18th century, after Cantemir, a lot of new valuable materials were accumulated on the soils, nature and economy of Moldova. At this stage, the range of information on soils, geography and relief of different parts of the country - its northern regions, the "Kodri Mountains", Budjak steppe, expanded.

The first schematic but scientific ideas arose about changes in soils and landscape from south to north; began to attach importance to the soils thickness and their color.

The first comprehensive soil-geological map of south-eastern Europe was compiled, on which there was a lot of data for Moldova. Materials on the soils and nature of Moldova were quite widely published in Russian and foreign works, commented on, included in atlases and dictionaries, and used in military affairs and for economic purposes. The best areas of horticulture, viticulture and winemaking (south-eastern of Transnistria, the vicinity of Akerman), and tobacco growing (Malovata) were identified, with a certain reference to soils.

4. The involvement of Moldova in the Russian science (from 1812 to middle of the 19th century). The first half of the last century was an important period in the study of Bessarabia, which coincided with the time of its rather noticeable economic development. Studies of the region nature, to a greater extent acquired a scientific character and at the same time received a well-known practical application. The study period results under consideration should be considered: a clearer, compared with the previous period, division of the country into three parts according to climate, topography, soil and agriculture; the emergence of new facts and ideas about the structure, thickness, fertility, geographical variability, and even about the origin of chernozem soils; the inclusion of natural science information about Bessarabia in all-Russian geographical reports; practical use of data on soils during land surveying, their allocation for immigrants, in justifying the placement of horticulture, viticulture and other agricultural sectors.

5. The beginning of the scientific statement of chernozems question of South-Western Russia (50-70 years of the 19th century). The most important achievements of this period should be considered: the establishment of four "steps" of chernozem (prototypes of modern subtypes), differing in fertility, thickness, "obesity", geographical and hypsometric confinement; the beginning of "binary" approach to soil classification, on the one hand, according to "organic composition" and, on the other, according to "mineral properties"; the division of the space between Prut and Ingul into four soil-landscape "bands", which were simultaneously considered as agricultural zones; revealing the connections between the terrain (absolute altitude, river terraces, watersheds) and soils - their "obesity", thickness and productivity; conducting the first chemical and physical studies of soils, establishing the features of their temperature regime.

6. Expeditions and researches of Dokuchaev. In the study of the chernozem zone of Russia Dokuchaev paid great attention to the soils of the south-western part of our country. The materials he collected in this region played a significant role in substantiating the laws of zones of nature and a number of important laws of the genesis and geography of chernozems and gray forest soils. At the same time, the natural - historical studies of Dokuchaev on the Dniester - Prut interfluves, which constituted the territory of the Bessarabia province, were of very significant importance.

Travelling on Bessarabia (1877 and 1898) Dokuchaev crossed it from Khotyn Height to the Danube and the Black Sea. The results of these trips are summarized in the "Russian Black Soils" (1883) and in the work "On the Question of the Bessarabia's Soils" (1900). These works laid the foundations of many modern ideas about the geographical distribution, genesis and soil properties of Moldova and the neighbouring regions of the Chernovtsy, Vinnitsa and Odessa regions of Ukraine. Information on the soils of Bessarabia is also given in many books, articles, reports and speeches (7, 10).

7. The content of studies conducted by V.V. Dokuchaev in Bessarabia. The first information on Moldovan soils, based on literature data, is given in the early works of Dokuchaev "Cartography of Russian Soils" in 1879 and "Results on Russian Black Soil" in 1877a. Later, guided by this program, Dokuchaev travelled and studied the entire steppe and forest-steppe stripes of European Russia. After reviewing the soils of Bessarabia, Dokuchaev concluded that here "we have representatives in all horizontal soil zones of European Russia, with the exception of the tundra," and identified the following "types" of soils in Bessarabia:

1. "Typically chernozemic", distributed in the northern third of the province, but at certain heights found in other parts of it.
2. “Mergelic-chernozemic” - the most characteristic for relatively lower expanses of the south.
3. "Saline soils", which are most found in areas adjacent to the Black Sea and the Danube.
4. "Typically forest soils" of northern and central Moldova, divided into "oak", relatively close to chernozems, and "beech", significantly podzolized.
5. "Abnormal soils", which included highly eroded soils of steep slopes, alluvial soils, sandy soils subject to deflation.

For leading "types" of soils, indicators of their morphology and some chemical properties are given, namely: analyzes of hygroscopic water, humus, gross chemical composition, 10% and 1% hydrochloric acid extracts, and sulphate extract. In addition to establishing a number of laws governing the distribution of chernozems and forest soils, the work “On the issue of soils of Bessarabia” specifies the idea of altitudinal differentiation of soils in the Dniester-Prut interfluves. Thus, Dokuchaev formulated the foundations of modern views on the Moldavian soils distribution and characteristics, as well as neighbouring territories, which constitute a well-known physical-geographical whole.

8. The role of Dokuchaev Bessarabia materials in substantiating some theoretical principles of soil science. The period of the Dokuchaev expeditions marked the period to purely scientific soil science both in Russia as a whole and in the south-western region - Bessarabia, for which important facts and regularities were established, namely: belonging to the chernozem zone; the specific nature of geological and geomorphological conditions and soils, the distinguishing feature of which is low humus content; contrast, diversity of the soil cover, its high-altitude differentiation, most pronounced in the interfluves of the Dniester and the Prut; wide opportunities for diverse specialization of agriculture, determined by the characteristics of soil and climatic conditions.

9. The period from the appearance of Dokuchaev's work on the soils of Bessarabia (1900) and until 1918 is rich in new trends in the development of scientific ideas about the soils of the region. For this period, it is important to note the following:
- Compilation of the first modern soil maps of Bessarabia and neighboring provinces.
- The study of deep sections (profile) of soils, in particular chernozems, accompanied by their "profile" analyzes, which revealed the deep desalination of south-western chernozems, their thickness, the nature of the distribution of carbonates and molehills.
- The division of chernozems into subtypes and establishment the fact of "extreme non typical of local chestnut soils".
- Confirmation of Dokuchaev’s thought about the low humus content of western chernozems as their significant provincial features.
- Concretization of the issue of eroded and cumulic soils, their distribution and causes of formation.
- The beginning of field experiments on the treatment, fertilizer and erosion protection of soils in a specific relation to soil conditions.
- Deepening the understanding of relationship between soils and culture of grapes and fruit trees. The beginning of special scientific studies on "orchards - vineyards soil science."
- Creation of extensive collections of Moldavian soils monoliths and, in general, of the South-West region and their display in museums of Chisinau and Odessa.
- Wide and qualified use of soil materials in geographical and agronomic monographs.

Significant disadvantage of the period under consideration, which had its consequences until very recently, was the conduct in Bessarabia of only survey, general provincial soil-cartographic works, and while in many other places in Russia, even in Asia, county and even province maps were compiled with great success.

10. The main scientific results of 1918-1944 period should be considered:
- Comparison of the Moldova's chernozems with soils of the more western regions of the Danube Region and use the scientific ideas Romanian researchers.
- Detailing the characteristics of chernozems, dividing them into groups according to humus content, "degree of degradation".
- Compilation of several county soil maps and the first soil cartograms.

11. The value and implementation of N.A. Dimo ideas. The modern period of soil study in Moldova begins with the scientific activity of Academician N.A. Dimo after his return to homeland in 1945 (after 50 years). He created a scientific school of soil scientists, continuing the ideas of Dokuchaev. The main achievements of this period should be noted as follows:
- the current state of rural soil mapping, which continues, although it needs to be accelerated and updated based on GIS;
- the past, present and future of the Moldovan black soil, considered by Dimo our main natural resource;

- the soils humus state in the aspect of different agronomic methods of their use (cultivation, fertilizer, crop rotation);
- the study of phosphorus in soils and the peculiarities of behavior of phosphorus fertilizers;
- the trace elements content in soils and plants;
- assessment and variability of physical properties and soil regimes, a new classification of soil types;
- the results of half century of experiments with fertilizers in relation to subtypes of chernozems and forest soils established (4).

II. Current state of Moldova's soil cover

Soil condition is unsatisfactory in approximately 60% of the area. In Moldova, as in other countries, the share of arable land per capita is decreasing. According to recent data, this area is 0.407 ha (14). The annual losses of the country's economy from soil degradation processes are enormous. The main activity causing negative changes in the state of soil cover is agriculture. Intensive land development and ploughing along the slope activate water erosion processes. Irrigation often causes secondary salinization of soils. The insufficient application of organic fertilizers, which does not compensate for the loss of organic substances, leads to dehumification, and the irrational use of pesticides leads to soil pollution. Excessive application of mineral (nitrogen) fertilizers causes their acidification, and unsystematic grazing of livestock leads to the destruction of vegetation, the intensification of water and wind erosion, and pollution of soils and reservoirs with manure (17).

Soils in Moldova are represented by fertile black soil and productive agricultural land. Almost every second hectare of land is of average quality, 700 thousand hectares (27% of agricultural land) are of good quality. However, soil tolerance decreased by 7 points over 30 years as a result of its intensive use in agriculture and climate change. Soils affected by various degradation processes occupy more than 1.9 million ha (15).

1. The modern humus state of arable soils in Moldova is due to the long period of their use in agriculture. Studies conducted in Moldova about 140 years ago by V.V. Dokuchaev, it was shown that chernozems contained 5-6% of humus. In subsequent years, the natural soil fertility of Moldova was constantly decreasing, which led to an average content of 3.1% humus in the upper layer of arable soils. The rhythms of these processes were different depending on the nature of the agricultural use lands. The average loss of soil organic matter is 0.5 t/ha per year (2, 12). The modern period is very important and can be called critical, bearing in mind the humus state of soils. If the degradation of natural fertility is not stopped by adequate measures, the level of humus content will reach values close to 2%, which corresponds to the lower threshold for chernozems. Humus stabilization at this level will limit grain yields by 1.5–2.0 t/ha. Fertility regeneration, starting from a critical level, will be very difficult to realized, it will take costs and efforts much longer and longer (1, 3, 11).

2. The state of nutrient regimes of soils (3,14,15). In the pedoclimatical conditions of Moldova, the optimal nutrient regimes is considered to be one that ensures the yield determined by the water availability of plants. Under conditions of negative humus balance, the after-effect of nitrogen fertilizers ceased after a few years. Currently, the *nitrogen nutrient regime* of soils is almost entirely determined by the humus content. Soils provide agricultural crops by nitrogen in all areas of the republic within 70-90 kg/ha per year. This level is only 60% of the necessary for optimal yields. Only 2% of arable land corresponds to this level

Phosphorus regime. In the soils of Moldova, phosphorus available to plants, like mineral nitrogen, is in the first minimum. Since the humus content has not changed during the 30-year period, it can be assumed that the immobilization of phosphorus was due to the gradual formation of insoluble compounds, which are not widely available to plants. A sharp decrease in the application of nitrogen fertilizers since 1992 did not allow the use of the accumulated phosphorus reserve, which was subject to chemical degradation. Consequently, phosphorus reserves in fertilized soils decreased to the level characteristic of unfertilized soils.

Potassium regime. Potassium state is predetermined by the mineralogical composition of soils. The forecast shows that until 2025 the potassium regime of Moldavian soils will not limit the production of high yields of most crops by 90% of the area. For demanding crops, the deficit can be compensated by plant debris and moderate doses of organic fertilizers. In recent decades, a negative balance of all nutrients has been established in soils: nitrogen in the range of 20-35 kg/ha, phosphorus - 25-40 kg/ha, potassium - 340-355 kg/ha (14, 15).

3. The deterioration of the *physical properties and regimes* of arable soils is due to deterioration of the structure and secondary compaction. To minimize these processes, it is necessary to introduce crop rotation with the participation of perennial grasses of 20-30%, introduce organic fertilizers, and optimize soil tillage systems. Local resources of organic matter

and nutrients necessary for plant nutrition and restoration of soil fertility consist of plant residues left on the field after harvesting, organic fertilizers of the livestock sector, various organogenic wastes of processing enterprises, agricultural raw materials, municipal services.

4. The current biological state of soils is determined by their taxonomic affiliation, duration of agricultural use, after-effect of applied intensive technologies in the period 1970-1990, intensified by anthropogenic impact on the soil and its biota in the subsequent period as a result of a significant deficit of fertilizers, disturbances crop rotation, deterioration of physical and chemical properties, etc. The number and variety of invertebrates and microorganisms, as well as the level of enzymatic activity of soils are reduced in according to a decrease in the energy potential of soils. Long-term agricultural use of soils has caused a change in the functioning of the biota complex. Changes in its composition persist for a long time and, according to some indicators, are irreversible (14, 15).

5. Problems of soil fertility conservation. Land degradation is the most important environmental problem for Moldova. The problem of soil erosion is especially acute, the area of eroded soil increases every year: from 28% in 1965 to 40% in 2015. The problems of salinization, compaction, water-logging, soil contamination, dehumification and loss of productivity are also aggravated (11, 12, 11).

The problem of degradation is serious, because the productivity of agricultural land decreases precisely when socio-economic changes occur. Until 1990, the main reason for the widespread development of soil degradation processes in Moldova was the excessive intensification of agricultural production, disturbance of ecological balance in landscapes. After 1990, the following events had a significant impact on soil resources and the agricultural system: the adoption of a new Land Code, the implementation of land reform, and the soil privatization. Land reform has fundamentally changed the structure of land tenure and land use. However, these and other land transformations did not create the conditions for the protection, land reclamation, and rational use of soils, increasing their fertility, and increasing agricultural production. products (14).

The scale of the present crisis in the agricultural sector production and its interaction with macroeconomic processes require an integrated approach to the protection and rational use of soils. Sustainable socio-economic development is possible only if the productive capacity of soils used in agriculture and forestry is maintained for a long time by preventing and combating the processes of their degradation.

Efforts to combat land degradation in Moldova so far have had only limited success. Such an example is the "Program for the conservation and improvement the soil fertility for 2011-2020" (Government Decision No. 626 of 08/20/2011) and Action Plans for its implementation - for 2011-2013, 2014-2016, 2017-2020 periods. The program provides for the following: creation and improvement of scientific and technical base to ensure the implementation of land reclamation works and its constant updating; creation of information system for soil quality and constant updating of the database; preventing the development of active forms of soil degradation on an area of 877 thousand ha of eroded land; introduction of methods for maintaining and improving soil fertility in arable land of 1.7 million hectares - until the end of 2020 (15).

For full implementation of all tasks set of the program, tactical efforts are needed: to train local land user personnel and the modern methods of land conservation and restoration, as well as create educational institutions for agricultural land owners, consultants and land users to train specialists; expand and strengthen national research capacity in order to identify and implement effective land conservation and restoration practices that meet the existing socio-economic and physical conditions of land use. It is also necessary to coordinate all measures, strategies and programs for conservation and restoration of land with national agricultural development programs, national environmental programs and country action plans in the field of climate change and desertification and others (3).

In the near future, it is necessary to provide the zonal and district programs for conservation and rational use of existing soil fertility, and within the framework of these documents, plan and carry out the following:

- conduct a complete inventory of available land - arable land, perennial plantations, pastures and fallow (no arable) plots and develop scientifically recommendations for their further rational use;
- carry out soil mapping, as well as agrochemical, agroecological and land reclamation surveys of all agricultural lands;
- for all households, regardless of ownership, to develop projects for rational use of available land resources and conduct on-farm organization of territories taking into account landscape, natural and economic features and shared ownership of citizens;

- design modern crop rotation, soil tillage systems, plant protection, fertilizer application, soil fertility restoration and other organizational and economic measures that ensure sustainable production in conditions of limited use of material resources [1, 9, 10].

Well-planned long-term national and regional land conservation and restoration programs must be accompanied by strong political support and adequate funding, and then success is guaranteed.

III. Trends of Moldovan soil evolution

In the "Russian Black Soil" by Dokuchaev (1883) we do not find any facts about the degradation of black soil, and only nine years later in the book "Our steppes before and now", the author writes: "... due to erosion the surface of the steppes, which means that physical evaporation increased by 25%, and in some places by 50%, endless plains in many places turned into hills, into narrow plateaus and slopes, and the area of various uncomfortable lands increased significantly" (8).

The ploughing of chernozems deprived him of the "protection inherent in his granular structure". Erosion of the chernozem intensified and his "almost widespread ploughing and, therefore, exhaustion" occurred. Chernozem - "an organism that is well-built and has high natural qualities, but its strength is torn, depleted, it is no longer able to work correctly". Before us is a bright and completely pessimistic forecast, although this word was not used then. "Dokuchaev considered forecasting the highest aspiration of any natural science" (16).

The modern period is marked by an increase in the number of different predictions about the soil cover evolution. Krupenikov (6) suggested 4 scenarios for predicting the soil resources state of the republic, different in their essence, environmental and social consequences, but all can be considered real.

The first - ***restoration*** scenario is based on the numerous statements that earlier the nature and soil cover of Moldova were ecologically impeccable, and the whole task is that the past simply needs to be restored, remediated. But these are precisely statements, not arguments, because there are no studies as such on this topic. This scenario proposes to double-triple the area of forests, but this will have to significantly reduce the arable land; do not use mineral fertilizers at all, but the proper fertility potential must be maintained in the soil; etc. Although the partial implementation of this forecast may be based on the improvement of "human qualities". According to Krupenikov (6), a restoration path of development is impossible for Moldova, but it is useful to listen to the opinion of its supporters.

The second scenario is ***pessimistic***, based on the principle of spreading in the near future what has happened in the recent past. For the possible development of natural phenomena or related to them, to which agriculture relates, it is quite acceptable as alternatives. When implementing this forecast, the soil erosion process will on average annually cover about 1% of the new cultivated soil areas and in 20-25 years, almost all slope lands will be transferred to the eroded soil group. This will be accompanied by the transition of weakly eroded soils to moderatly eroded soils, and then to strongly eroded soils, which is confirmed by the annual growth rates of the areas of these three categories of eroded soils. For example, in the center of Moldova, weakly eroded soils grow by an average of 0.3% per year, moderately and strongly eroded soils together by 0.6%, in the south of Moldova these two soil group are 0.2% and 0.9%, respectively; the situation is even more menacing.

If this forecast is realized, many deterioration processes of chemical composition, physical properties and biological regime of soils will undergo, crushing of the eroded soils areas on the slopes will intensify, they will become smaller and more contrasting, which will complicate land management and generally use the soil as a resource. The average bonitet of arable lands of the republic will decrease by several points (3-6).

Pessimistic forecast can be considered potentially dangerous, because it reproduces the recent past, when many decisions were made, and partly the conditions for the soils protection.

The third forecast - ***skeptical***, for two reasons. Firstly, it does not reproduce the past, but proceeds from a number of constructive premises. Secondly, it is aimed only at neutralizing negative processes, and not at turning them in a positive direction. For example, using the entire arsenal of means to combat soil erosion, farms on all cultivated lands will reduce its size to an acceptable minimum of about 5 t/ha per year. However, this indicator should not be understood as average, but as the limit for each inclined site. With such eroded sizes, the soil-forming process will compensate the erosion effect, but no more. The eroded soils are stabilizing in their current state (profile structure, thickness, humus reserves, bonitet), and the process of their bio-regeneration will go very slowly.

Changing in the cultivated areas structure, is true, but not formal development of crop rotation, their saturation with perennial grasses, rational irrigation with its gradual expansion, full and skilful

use of all types of organic fertilizers, biowaste from industry and municipal services, the composts use, will achieve a neutral humus soil balance, which in combination with a complex of anti-erosion technologies stabilizes the bonitet of all cultivated soils at more or less constant level.

In carrying out this forecast, it will be necessary to concentrate efforts on the maximum spatial limitation of soil use for non-agricultural purposes. This scenario, although it will not provide a noticeable turn in the direction of increasing soil fertility, will nevertheless create a favorable ecological background for increasing the general bio-productivity of agriculture in the republic. This will be due to the success of plant selection and agricultural technologies, which at present (scenario I) is offset by erosion and a decrease in soils humus content.

The fourth scenario is ***optimistic***, based on the idea of expanded reproduction of soil fertility and the advantages of soil cover. To implement an optimistic scenario, it is important not only to suppress soil erosion, but also to restore it by selective reclamation of part of moderately and heavily eroded soils on the slopes due to humus reserves of eroded and floodplain soils and silt sediments of water bodies. This path is difficult, but technically feasible, as proved by a series of field experiences in Moldova and Ukraine.

The implementation of the fourth scenario will require a system of land reclamation, agrotechnical, sanitary-hygienic, organizational and legal, scientific developments and decisions made on their basis. Therefore, it is still very necessary that environmental knowledge develop into the ecological consciousness of the majority.

This is the kind of alternative forecasting of the soil cover state proposed for Moldova at the first time. If we agree with the reality of these forecasts, then they should be carefully worked out a quantitative level and in the context of regional combinations of environmental conditions: in the most schematic form - north, center, south. Then the forecasts will become more convincing, and the second one can be called environmentally threatening, the third - environmentally optimized, the fourth - environmentally harmonious (**).**

Conclusions

The area of all chernozems in Moldova is about 2.5 million hectares, or about 80% of the republic territory, it can be considered that agricultural land is 80-85% located on chernozems. At present, in Moldova there are many problematic issues of agricultural importance, which rest against the need for an accurate and in-depth study of soils, especially chernozems.

The main tasks of soils studying described by N.A. Dimo in the book "Soils of Moldova, the tasks of their study and the most important features" (4), are relevant at the present time.

“All of the above allows us to consider as one of the main tasks of Moldavian soil scientists the most thorough study and establishment the laws of humus content and reserves in all types and subtypes of soils, their genera, types and varieties. Moreover, the definitions and calculations must be combined with the conditions of soil occurrence: relief and its slopes, parent rocks, the degree of soils development on the slopes and the state of their erosion, prescription of cultivation, etc. In any case, the cited materials make it possible to consider the chernozems of Moldova so peculiar that they cannot be classified as ordinary, low-humus and other units; to correctly attribute its to ploughed chernozems of the ***Moldavian province,*** understanding it geographically wider than the borders of our republic" (4).

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