

Chernozem Soils of Gagauz Yeri

Liudmila FEDOTOVA

Comrat State University of the Agro-technological faculty, Comrat, Republic of Moldova

*Corresponding author: fedotovar@mail.ru

Abstract

This article is dedicated to soils, that cover 75% of Gagauz Yeri territory - those are carbonate and ordinary chernozem. These soils are plowed intensively, losing the fertility and, as a result, degrade. It is necessary to conduct an agrochemical examination once every 5 years for improving the soil quality. The examination is always carried for vineyards and gardens, but not for soils. The last soil examination was conducted back to 1986 during the collective farms period. The data on N,P,K is received if one conducts the agrochemical research, as well as the monitoring of humus quality. Monitoring shows the soil quality and the need for additional soil nutrition.

Key words: Soil, Carbonate Chernozem, Ordinary Chernozem, Desertification, Degradation, Environmental protection, Monitoring.

1.Introduction

It's often said that Moldova is an agrarian country. Investments are usually attracted to Gagauzia mainly by the agricultural sector. Why is that? Agriculture is a type of sector that will always be in demand. Livestock and plant products are bought daily! Consumers prefer domestic products of high quality. Being concerned about health people want to have a choice of organic and environmentally friendly products. Current realities require us to think about what kind of food we eat every day. As Hippocrates said, "We are what we eat". The consumer is not interested in the entire food chain production. What's taken into account is quality and healthy products. Agrarians have to take care not only of the amount but also of the high-quality crops. In pursuit of large crops it's more often forgotten about the main important factor as fertility and healthy condition of the soil.

What happens to the soil then? Mineral fertilizers are applied to the soil annually, pesticides are used to combat diseases and pests. Have all the farms conducted soil agrochemical examination? Let's think about the number of nutrients in the soil we are using. One can receive this answer only after the laboratory determines at

least the basic elements of N, P, K and humus.

Soils are unique in Moldova. The number of varieties comes to 745. The bulk part of Moldova is covered by chernozem types, which is almost 75 percent. The most fertile chernozem is the ordinary one. Its bonitet is equal to 100 points. Vasily Vasilyevich Dokuchaev (1884-1897), a Russian soil scientist, commended ordinary chernozem and named it first-class soil. Igor Arkadievich Krupenikov (1986) noted: "That the soils should be used for the cultivation of cereal grain material and even suggested these soils to be declared a state soil reserve with the prohibition of the soil removal for any non-agricultural purposes without the most urgent need" (Krupenikov, 1982).

Unfortunately, there is no ordinary chernozem in our region. All preconditions for soil formation in ATF Gagauzia, such as climate, that is warm, rather dry, with two winter-spring and summer maximums of atmospheric and soil moisture; vegetation in the past is a herbal-grass steppe with rich grass and a well-developed root system that deepens the soil; soil formation on loess-like loams and clays made it possible for chernozem and micellar-carbonate soils to evolve. The difference between these two subtypes are the following: carbonates of the carbonate soils are located on the surface, boiling from HCl in

ordinary soils occurs not from the surface, but at the depth of 35 cm (Krupenikov, 1967).

2.Results and Discussion

Ordinary chernozem is the main basis of the fields in Gagauz Yeri. Ordinary chernozem has good water properties - permeability and aeration, in spring it acquires agronomic ripeness (physical and biological) faster than other soils. The biggest issue regarding this type of soils is

insufficient moisture. Uneven rainfall, periodic droughts - all this leads to the fact that farmers can not get a stable annual crop of agricultural products. The effectiveness of mineral fertilizers is reduced. Ordinary chernozem has a low humus content at its significant depth (Atlas of Moldavian Soils, 1988). The structure is well defined, but fragile. The reaction is weakly alkaline. These soils are represented by heavy loam and loamy varieties.



Img.1. Sunflower field, Budjak village, 2019 (ordinary chernozem).

Carbonate chernozem is the driest and warmest soil. The humus content in such soils varies from 2.5 up to 3 percent in the horizon A. Exchangeable base cations are represented by Ca and Mg.

Capreavails in this case. Virgin lands of the carbonate chernozem are similar in some composition and properties to the ordinary chernozem.

Table 1. Exchangeable base cations absorption capacity, carbonates and pH in carbonate chernozem

Depth, cm	mg/eqv per 100 g of soil		Exchangeable base cations mg/eqv per 100 g of soil	CaCO ₃ %	pH
	Ca ⁺⁺	Mg ⁺⁺			
0-20	27.3	0.8	33.0	3.0	7.8
20-40	27.1	0.8	31.2	5.5	7.8
40-60	21.6	0.8	30.2	6.5	7.8
60-80	21.2	1.2	28.7	8.0	7.9
80-100	21.0	1.2	26.0	10.8	8.1
100-120	18.2	1.4	25.7	10.8	8.3

These soils have a simplified profile in comparison to other subtypes and a relatively narrow ratio of humic and fulvic acid carbon according to the data provided by Research Institute scientists on Soil Science and Agrochemistry named after N.A.Dimo.

Carbonate chernozem soils are in the condition of uneven and insufficient hydration, high moisture consumption for transpiration and evaporation [Journal «Soil of Moldova», 1986]. It can cause a moisture deficit. Soil bonitet is -71 by properties, -66-78 by the yield of field crops, -54-83 points for different cultivars of apple trees. The bonitet should be 100 points for the grape cultivation. The researched soils are characterized by average absorption capacity. Ca⁺⁺ content decreases with the depth.

Table 2. Change of humus content in carbonate chernozem Agro-Sadim farm (plowed field)

Depth, cm	Humus, %
0-20	2.8
20-30	2.58
30-40	2.27
40-50	2.19
50-60	1.94
60-70	1.72
70-80	1.5
90-100	1.12

Reduced humus content in carbonate chernozems is a consequence of the presence of CaCO₃ from the surface. Also humus reflects the peculiarities of modern bioclimatic environment.



Img.2. Vineyards on carbonate chernozem. Collective farm "Pobeda" Kipchak village, 2019.

Igor Arkadievich Krupenikov, (1982) noted that, even though carbonate chernozem is poorer in humus content than the ordinary one, lighter in color and less fertile, the arable layer contains a lot of lime, which causes an alkaline reaction. However, there are grape varieties that are adapted to excess lime and it is produced excellent dessert and red table wines (Fedotova and Mangul., 2006).

Talking about the soil we must understand that not only the crop, but also our health depends on it.

The careless attitude towards the soil of some agricultural enterprises managers leads to soil depletion and degradation. We will not get an indulgence for its intensive exploitation by applying only mineral fertilizers. On 24 December 1998 the Republic of Moldova joined the United Nations Convention to combat desertification in countries experiencing serious drought and/or desertification. The objective of the Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought or desertification by taking effective

action at all levels, supported by international cooperation and partnership agreements, within the framework of an integrated approach ,guided by the relevant Agenda 21 aimed at achieving sustainable development in the affected areas.

3.Conclusion

Desertification is mainly a sustainable development and environmental conservation issue. Desertification is caused not only by climate change but also by unsustainable human activities and agricultural illiteracy. The biggest problem is over-exploitation of lands in terms of the land use unsustainability.

Particular attention of the National Programme is paid to the implementation of preventive

measures for the lands that have not yet been degraded or have been only slightly degraded (Fedotova and Mangul, 2006). It means that all requirements should be respected when it comes

to the soil's issues.

We are obliged to protect this priceless gift - chernozem soils. It should be remembered that the future condition of the soil will depend on the way the agrarians conduct agricultural sector .

References

- Atlas of Moldavian Soils, 1988. Chisinau, "Stiinets": 51-54.
- Krupenikov, I.A., 1982. The dear nature of Moldova. Chisinau, «Cartya Moldovenyaske ": 88-89.
- Krupenikov, I.A., 1967. Chernozems of Moldova. Chisinau, "Cartya Moldovenienasca": 151-177.
- Fedotova L.V., Mangul I.D., 2006. Quality and environmental protection, desertification problems (on the example of Gagauz Yeri). Textbook, Comrat: 73-78.
- Journal «Soil of Moldova», 1986. Chisinau "Stiinza": 15-16.
- Unguryanu V.G., 1979. Soil and grapes. Chisinau, "Stiince": 209-210