Academicia Globe: Inderscience Research
ISSN: 2776-1010 Volume 3, Issue 12, Dec., 2022

ANALYSIS OF AGRICULTURAL CHEMICAL PROPERTIES OF WESTERN TYANSHAN MOUNTAIN SOIL

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INTRODUCTION

Today, as a result of global climate change, the loss of one of the main indicators of soil fertility-humus, namely, dehumification, leads to an acceleration of processes such as a decrease in fertility, erosion, and desertification. According to the FAO international organization, about 33% of the world's soils are subject to degradation to varying degrees. The main environmental problem of nature management and the effectiveness of biological resources is soil degradation. Along with other soils of the continent, soils of Uzbekistan are also subject to degradation. They also exhibit such phenomena as dehumification, loss of a granular water-resistant structure, compaction, decrease, thickness of the humus horizon, erosion, salinization, etc. Under these conditions, the importance of developing competitive resource-saving technologies for improving soil fertility and cultivating crops based on the achievements of biology and modern biotechnology. However, the development used to accelerate the increase in soil fertility and restore the fertility of degraded lands should play a dominant role. Using only technologies of previous decades does not allow us to successfully solve these problems in connection with two circumstances: firstly, due to accelerated soil degradation and intensive technogenic impacts; secondly, the last 30-40 years on the planet, significant climatic changes have begun, which also negatively affect the level of productivity of agroecosystems. Accordingly, to mitigate the negative effects of these two factors, it is necessary to increase attention to the development of fundamental problems of soil fertility. Among them, the mechanisms and nature of the accelerated reproduction of the humus content in all regions of the country, but especially in arid farming zones, play a particularly important role.

The degree of knowledge of the problem. Researches in the field of the amount of soil humus, its fractional-group composition, distribution patterns in the republic were carried out by F.Yu. Geltserem, P.N. Kostichev, N.P. Besedin with students, M.A.Belousov, S.N. Ryzhov with students (Rizhov, Tashkuziev, Ryzhov, Ziyamuhammedov), D.A. Makhmudova, as well as studies in the field of organic matter and the properties of erosion-prone various soils of mountain and foothill regions were carried out by H.M. Makhsudov, I. Turopov, R.K. Kuzievim , D.S. Tairbaeva, .Adilov, M.F. Fakhrutdinova, N.Yu. Abdurakhmonov, G.S. MiKhaydarovaG.M.Nabievoy, N.Shadievoy and other scientists.The physical properties of humus. Humus has certain physical properties, such as: 1) color, 2) characteristic structure, 3) bulk density, 4) stickiness and cohesion, 5) specific gravity, 6) significant water-holding ability, 7) water permeability, 8) heat capacity, 9) shrinkage upon drying, 10) coagulation under the influence of electrolytes, 11) absorption capacity in relation to salts and gases (large exchange capacity of absorption), 12) significant buffering capacity, and 13) specific smell.

The study of agrochemical properties is an important indicator for clarifying the types and differences of soils, when assessing the comparative potential soil fertility. Studies have shown that in the process

ISSN: 2776-1010 Volume 3, Issue 12, Dec., 2022

of flushing the upper, most fertile horizons, significant changes in its chemical and agrochemical properties occur.

It is known that mountain-brown soils are characterized by a high content of organic substances, therefore, they have an increased level of fertility. The results show that the humus content of the upper horizon of mountain-brown carbonate soils is 2.49-3.49%, decreases to 1.30-1 towards the bottom. thirty%. Gross forms of nitrogen, phosphorus and potassium inthe upper horizons are larger than the lower ones; a decrease is observed towards the bottom. The carbonate content in brown-carbonate soils along the profile varies in the range of 8.39-10.9% in non-washed soils, 10.8-11.2% in weakly washed soils and 10.4-11.8% in medium-washed soils. CO2 carbonates in mountain brown carbonate soils are 8.39-11.8%, in typical brown soils 3.69-11.61% and on leached brown soils 3.06-9.20%, and high amounts of carbonates reclaimed in the lower horizons of soils. In the arable horizon of these soils, the humus content on carbonate non-eroded mountain-brown soils was 3.49%, on weakly eroded soils - 2.90%, average eroded soils - 2.49%; on non-eroded typical brown soils - 3.79%, on weakly eroded soils - 3.57%, on average eroded soils - 2.96%, on washed soils - 4.36%; 4.50% on leached brown non-eroded soils, 3.75% on weakly eroded soils, –2.51% on medium-eroded soils. The content of gross nitrogen on carbonate non-eroded mountain-brown soils amounted to 0.260%, on weakly eroded soils - 0.165%, average eroded soils - 0.154%; 0.238% on non-eroded typical brown soils, 0.311% on weakly eroded soils, 0.268% on average eroded soils, 0.227% on washed soils; 0.235% on leached brown non-eroded soils, 0.182% on weakly eroded soils, and 0.175% on mid-eroded soils. The composition of leached mountain-brown soils showed a low content of carbonates, the pH of carbonate mountain-brown soils and typical soils is slightly acidic (pH in the range of 6.4-6.8). The C: N ratio in soils ranges from 9.3–12.9, in typical brown soils –– 7.5–13.1, in leached brown soils –– 9.3–14.0.The C: N ratio in mountain brown carbonate soils varies with the degree of susceptibility to erosion. So, the C: N ratio, that is, the enrichment of humus with nitrogen according to the level of the attribute, uncleaned ones belong to a high degree 1, and weakly and blurred differences of a middle I and II degree. The results of determining the pH of the soil show that the reaction of the soil medium in all differences is slightly alkaline (pH about -7.3).

An analysis of the agrochemical properties of mountain brown typical soils suggests that there is a more powerful humus horizon in these soils than in mountain brown carbonate soils.

The humus content in the upper layer of unwashed and slightly washed soils is 3.79% -3.57%, and decreases to the bottom. And in medium-washed soils in the upper layer, humus is 2.96% and decreases down to 0.85%. In the upper horizon of unwashed soils, gross nitrogen is 0.23%, in weakly and medium-washed soils 0.311% -0.268%, and gradually decreases down the profile. The phosphorus content in the upper horizons ranges from., 183 to 0.135%, as the degree of erosion increases, their content decreases. In the studied soils, the content of gross potassium also varies depending on the degree of leaching .

Studies have shown that erosion processes also affect the distribution of carbonates along the profile. The carbonate content in the studied soils along the profile is from 3.5 to 11.6%. Mountain brown typical soils differ from mountain brown carbonate in a lowercarbonate content. The C: N ratio in these soils,

ISSN: 2776-1010 Volume 3, Issue 12, Dec., 2022

according to the level of their characteristics, refers to unwashed and slightly washed to a medium degree, and medium washed to a high degree, the pH of the soil is slightly alkaline.According to the analysis of mountain-brown leached soils, it can be seen: that in these soils the humus content is higher than mountain-brown carbonate and mountain-brown soils, 4.50-3.75% humus is contained in the upper horizon of unwashed and slightly washed soils, down the profile decreases to 1.60-1.72%. In medium-washed soils inthe upper horizon, the humus content is 2.5% and down the profile decreases to 0.85%. In the upper horizon of unwashed soils, gross nitrogen is 0.235% in weakly and moderately washed soils 0.182% and 0.175% down and the profile decreases. The phosphorus content in the upper horizons ranges from 0.290 to 0.184% and decreases in degree of washing from 0.195% to 0.054%. (table 3.4.1.1.).The most important genetic properties of serozems, as pointed out by A.N. Rozanov [2.209; p.918-926], is the carbonate content. The nature of the distribution of carbonates reflects not only the current situation, but also the history of soil development and depends both on hydrothermal conditions, especially the water regime, and on the biological factor of soil formation (A.M. Mamytov, [2.156; p. 65-79]).

It is known that the process of soil formation in brown mountain soils occurs under conditions of carbonic weathering. According to this, one of the characteristic features of the chemical composition of these soils is the presence of lime carbon dioxide (CO_2 carbonates) in them.

Mountain brown weakly leaching, and therefore the location of the carbonate-illuvial horizon, depends on the strength and depth of soil wetting, the degree of carbonation of the soil-forming rocks and the terrain. The relief is a redistributor of precipitation and solar insolation. The temperature of the soil, its heating and drying, and, consequently, the pulling up of soil solutions, including carbonates, or their lowering, depend on this. In the leveled areas of the study area, soil washing is deeper and carbonates are lowered to a considerable depth. On the slopes of the southern exposures, they are closer to the surface, and if, moreover, the slopes of considerable mire and erosion of the upper horizons of the soil are eroded to different degrees, carbonates are in the upper horizon.In rainfed eroded carbonate-brown soils, the content, in addition to humus and nitrogen, of some other nutrients, in particular gross forms of phosphorus and potassium, decreases. The data show that the differences in the content of gross phosphorus and potassium in the arable horizons of poorly washed and unwashed soils are not very large, but a slight decrease in their total amount is observed on average washed-out differences. This is explained by the approach to the surface of the lower soil horizons, poor in phosphorus and potassium. The effect of water erosion on the content of phosphorus and potassium in the soil is most pronounced on medium-washed brown-carbonate soils and, therefore, a decrease in gross and mobile phosphorus due to an increase in the content of calcium carbonates in washed soils that form hardly solublephosphorus compounds. This is explained by the fact that, as erosion increases, lower layers containing more carbonates come to the surface. So, if in the upper horizon of poorly washed brown - carbonate and typical soils, the content of CO_2 carbonates is 5 - 2, then the average washed out 9-7%. As can be seen from the table, the increase in carbonate content in the upper horizons of washed brown-carbonate soils manifests itself more sharply than on weakly washed brown-typical soils since carbonates are washed deeper on typical brown soils.

ISSN: 2776-1010 Volume 3, Issue 12, Dec., 2022

The influence of water (storm) erosion on the position of gypsum neoplasms of virgin rainfed brown carbonate and typical brown soils of the studied object is not clearly manifested in all cases.

Thus, erosion processes significantly changed the chemical, agrochemical properties of mountain brown soils. With an increase in the degree of erosion, the content and reserves of humus and nutrients decreased; accordingly, this physical parameter worsened some physical properties, in particular the soil structure, and reduced the amount of moisture in the soil.

CONCLUSION

1. From light-colored, typical gray soils to dark-brown and mountain-brown soils, the activity of the studied oxidation-reduction enzymes increases with increasing total microbiological activity, the amount of humus and nutrients. The greatest activity of enzymes is manifested in the upper layer of the soil and their sharp decrease in the lower layers, which is especially observed in eroded soils, and in non-eroded and eroded soils, the stability of enzymes is significantly lower than the profile of microorganisms. changes in carbonates, aggravation of mechanical composition, soil density, genetic layers of soils. A close link has been established between humus substances in soils and respiration and enzymatic activity.

3. Western Tien-Shan brown carbonate, brown typical brown alkaline soils regional specificity of humus state, ie regressive-accumulative type of humus profile, increased hydrolyzability and average moisture content of organic matter, humicity level of organic matter (from high to weak), mainly fulvate in humus and humate-fulvate types and fractional properties of humic acids.

4. In describing the diagnostic indicators of mountain soils from new materials of scientific and practical importance in terms of humus formation, humus status, elemental composition, physicochemical properties and fertility of humus substances of the Western Tien Shan mountain and foothill soils, maintaining and restoring soil fertility and is recommended for use in the development of enhancement measures, as well as in lectures in the fields of soil science, erosion, soil conservation, soil chemistry.

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