RESEARCH ON HUMUS CONTENT CHANGE ON BOHORELU DUMP, WITHIN THE MINING CARRER SOUTH JILT

DINUCĂ NICOLAE CĂTĂLIN
The Ministry of Waters and Forests, Ramnicu Valcea Forest Guard,
catalindinuca@yahoo.com

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ABSTRACT

The success of the ecological reconstruction of the dumps by plantation of forest species is strongly influenced by the chemical properties of the stockpiled material, that the content of humus, total nitrogen, flying phosphorus and flying potassium, as well as of the reaction of the soil and of the base saturation degree.In this respect the following is the humus content of the stockpiled material from the soil elevations carried on the Bohorelu dump.The analysis of the chemical properties shown in Figure number 1 shows that the content of organic matter (humus) decreases from surface to depth in all analised elevations. In the six secondary profiles on the slopes, the organic matter proportion varies from the very small to small, in the first three elevations and medium in the following two.The total spare of humus and organic matter on the total depth of the 50 cm has values of less than 30 t/ha.Consequently the providing with the total nitrogen is very low in all analised elevations.On the Bohorelu dumps, both on stabilized and not covered with afforestation works dump surfaces and afforested dumps, were carried on six soil elevations.

INTRODUCTION

The Bohorelu Dump is part of the External Pond belonging to the Southern Jilty Quarry and is located on the territory of the Dragotesti Village,Bohorel, on the former valley of the Bohorelu Brook. From a geomorphologic point of view, the heap falls into the great geomorphological unit - Subcarpathian Hills, Motru, the interfluvium between Jiu and Motru, on the former valley of the Bohorelu brook.

The Bohorelu Dump is made up of numerous rows and sterile piles consisting of mixtures of lithological materials deposited absolutely randomly. From a microgeomorphological point of view, the area under study is characterized by two distinct areas, namely: the platform and the marginal areas of the platform. The platform is the result of a primary arrangement for technological purposes. The general aspect of the platform is planar, slightly inclined, moderately uneven, with a general slope of 0-5% (0-2% and 2-5%). Within the platform, a line with the highest pitch is shown, with a slope in the S-SE direction (2-5%). In contrast to water, the platform has a general inclination towards E-NE (2-5%) and a tilt to V-SV (2-5%).

At microrelief level, the platform is heavily bent with microdepression zones that condition excess moisture, either permanently or temporarily. In the middle, the platform is separated into two by a slope with a slope of 25-35% and even more than 35%.In the marginal areas, both to the east and to the west, the platform is bordered by a heavily inclined slope (25-35% and more than 35%) with a continuous and uneven appearance.

From geologically and lithologically point of view, the Bohorelu Dump is very complex, complex due to the fact that different underlying rocks such as geological age, thickness, nature, granulometry were upgraded and mixed in a heterogeneous way. The natural lithological structure of the land is

modified at high depths of 150-200 m through the ongoing coal mining activity.

All these mixtures of rocks (clay, sands) differing in geological age, thickness, nature, granulometry, are devoid of fertility or have very low fertility. Due to this, the lithological materials constituting the studied heap have different degrees of rehabilitation. Halden materials due to heterogeneity create particular problems in the recultivation process because cultural measures can not be differentiated on each type of material due to reduced uneven surfaces and with different treatment needs. The material heterogeneity is found both vertically and horizontally.

Within Bohorelu Dump,lithological materials with medium texture are predominant, with variations from medium-coarse to medium-fine. Thus in large percentage predominates the tiles (medium and fine clay). Interleaved among these were coarse material (sands) and fine (clay) but in a smaller percentage, which did not allow their individualization to be separated.

MATERIAL AND METHOD

The soils identified on the Bohorelu Dump belong to the technosols class and are soils with a large skeletal content, mainly based on the profile. The values of the humus content taken from the sample analysis bulletins collected on such soils characterize the humus content of the fine earth. Humus content is an important indicator because the soil's trophicity is infuenced by the amount of humus. The Walkley-Black method consists in the humid oxidation of carbon in the organic soil.

Estimated values for standard depths for humus content of fine earth are shown in Figure 1.

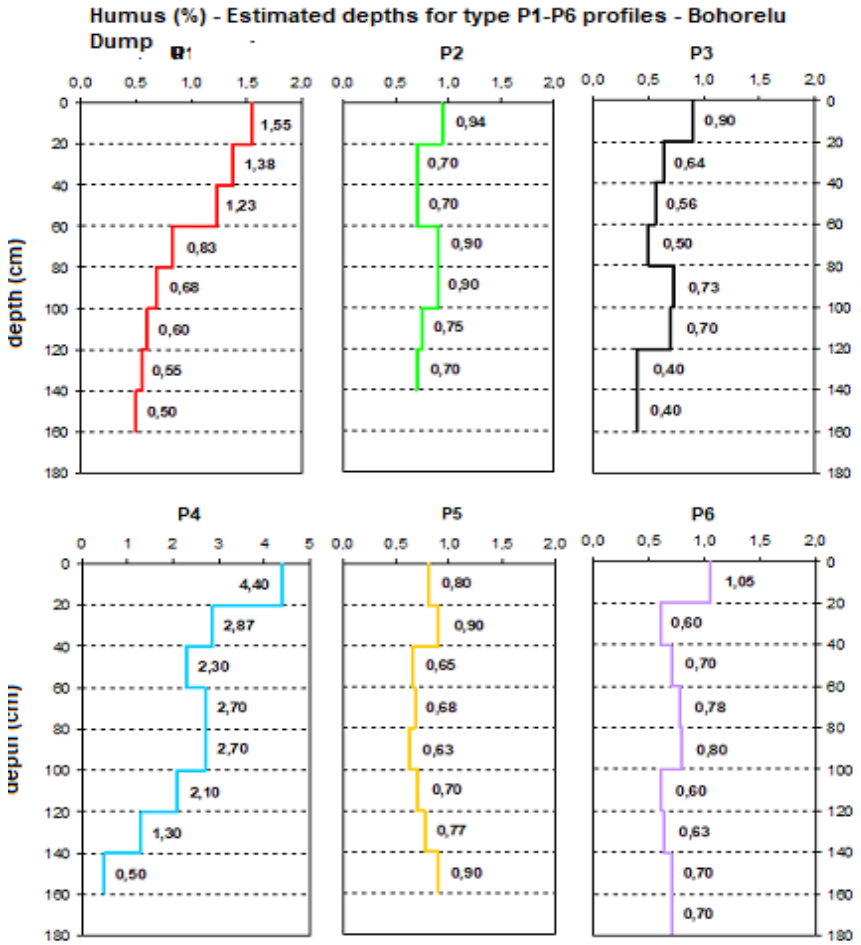

Figure no. 1 Changes in estimated values depths type humus content

RESULTS AND DISCUSSIONS

In the case of the P1 profile, there is a tendency of continuous decrease of the humus content starting from the soil surface towards the base of the profile. In the 0-20 cm layer the maximum value is recorded of 1.55% and the layer at the base of the profile (140-160 cm) is characterized by the minimum value (0.5%) The amplitude of the variation range is 1.05%. The values of the humus content estimated for the 7 layers of the P2 profile are within the range of 0.7-0.94 %, which has an amplitude of 0.24%. The small variation range indicates a low variability of the humus content on the profile.

And for the P3 profile the variability of the humus content is small, the variation range having an amplitude of 0.5%. The maximum value (0.9%) is obtained in the soil surface layer and the minimum value characterizes the last 2 layers at the base of the profile. A general tendency to decrease the humus content from the surface of the soil to the base of the profile is observed.

A high humus content of 20 cm (4.4%) is observed on profile P4. It is possible that the high humus content was due to the fact that a few years ago in the opening area of the profile was placed a the large amount of organic matter produced by animals modifying the humus content in the soil layer. There is a general tendency to decrease the humus content reaching 0.5% on the basis of the profile. The magnitude of the variation range (3.9%) is high for a characteristic that typically has a low level of values.The amplitude of magnitude of the variation range amplitude indicates a considerable variability in humus content relative to the depth.

The variation of the humus content for the P5 profile is similar to that found on the P2 profile. Thus, the range of variation (0.63-0.90) has a reduced amplitude of only 0.27%, indicating a small variability of this characteristic depending on the depth.

The behavior of the P6 profile in terms of humus content resembles that of the P3 profile. The maximum level of 1.05% is obtained in the layer at the surface of the profile, in the immediately following layer the content decreases to 0.6%, after which it increases at a depth of 100 cm, where the value of 0.8% is recorded, there is a decrease in the layer 100-120 cm to 0.6% and then a slow increase to the base of the profile. The variation amplitude (0.6-1 , 05%) has a value of 0.45% and quantifies the low variability of humus content across the section of the profile.

Representing on the same graph (figure no.2) the variation of the values of the humus content, depending on the depth, for the profiles made on the Bohorelu dump, the following aspects are observed:

- the points representing the values corresponding to the profiles P1, P2, P3, P5, P6 are grouped in the left part of the graph with most values less than 1.5%.
- the points obtained for the profile P4 up to a depth of 120 cm are located on the right side of the chart, being far removed from the points representing the values obtained for the other profiles. For this reason, the variability of humus content in layers with depths less than 120 cm is very high, the maximum variability being in the 0-20 cm layer.

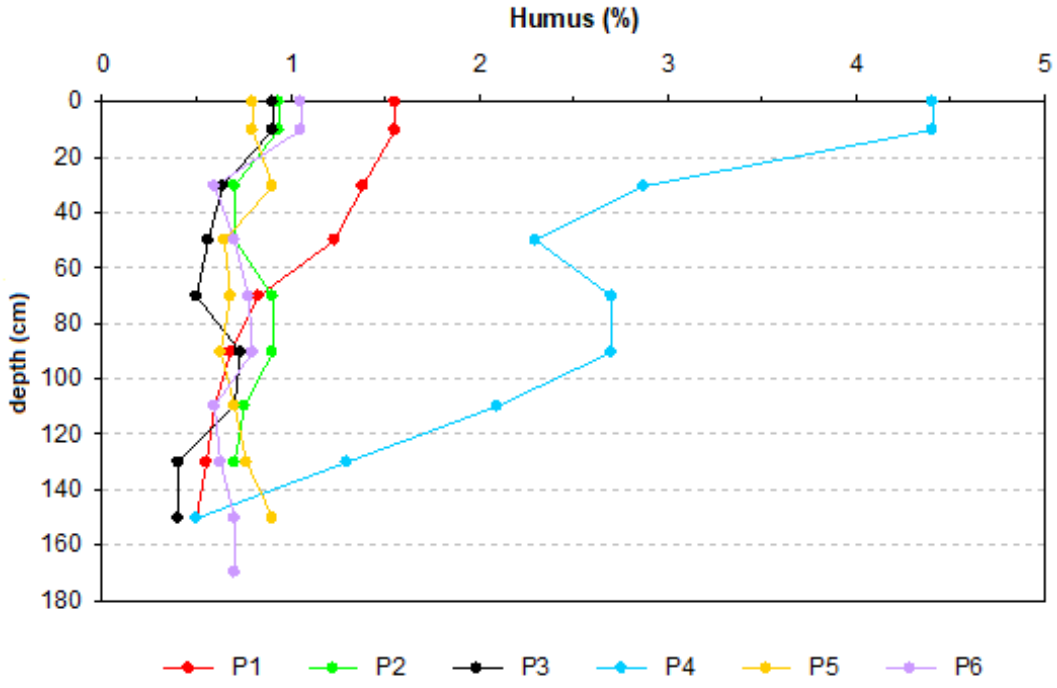

Figure no. 2 Changes in estimated values depths humus content type all 6 profiles made Bohorelu.

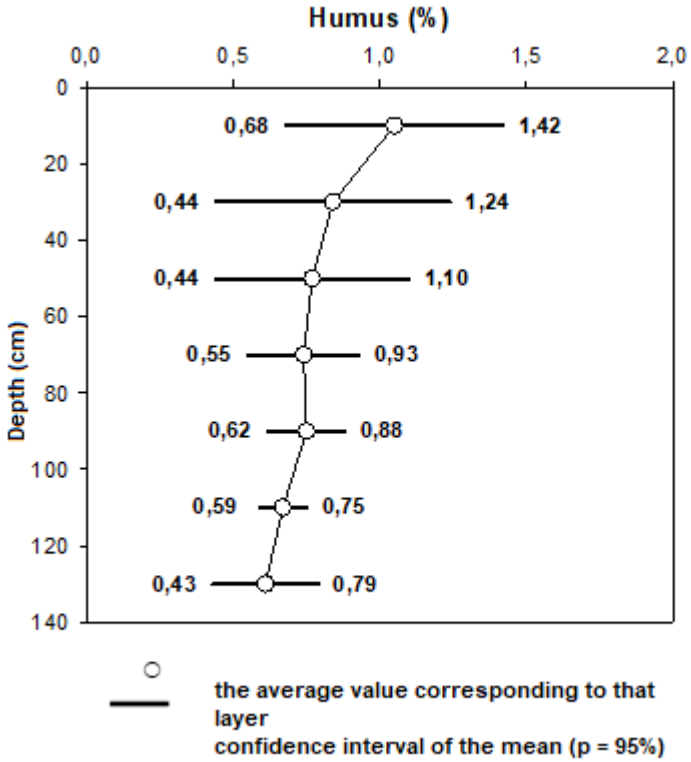

Figure no.3 The confidence intervals corresponding to the average content of humus. (Bohorelu dump profiles P1, P2, P3, P5 and P6, the confidence level p = 95%)

Considering the very different behavior of the P4 profile over the other 5 profiles, the values obtained for this profile will not be taken into account in calculating the mean values and the

confidence intervals corresponding to them for the Bohorelu Dump.

The figure 3 shows the average humus content for the Bohorelu Dump. An almost continuous decline in humus content is observed with the increase in the depth of the characteristic layer.

The average value in the 0-20 cm layer is greater than 1%, all the other mean values being less than 1%.

Another aspect that can be noticed from this graph is the large variation in the lengths of the estimated confidence intervals. Thus, the confidence interval of the average of the longest length was obtained for the 20-40 cm layer and has an amplitude of 0.8% and the confidence interval of the smallest length was obtained for the layer 100-120 cm and is 0.16% long.

It can be seen that the confidence intervals corresponding to the first three layers have the longest lengths, indicating that up to 60 cm the humus content has a greater variability than the one that was found in the layers with depths greater than 60 cm. The increased variability is determined by values obtained for profile P1.

Since the seven intervals have the unseen intersection (contain all the range 0.62 - 0.75), we can not statistically claim that the observed differences between the mean values of the 7 layers are significant.

CONCLUSIONS

From the researches carried out in the graphs presented and the field observations on the Bohorelu Dump,the following conclusions can be drawn:

In addition to changes directly produced by coal mining, numerous morphological changes have taken place due to erosion through water and wind, crashes, landslides.

At the same time, in the mining process, the soil factor has disappeared, although sometimes the fertile soil horizon has been selectively decanted and deposited in order to be used to cover the landscaped areas in order to reduce the improvement period.

In addition to these morphological changes of the natural framework, numerous physico-chemical changes have taken place. Thus,the lithological materials that are in the dump are very heterogeneous from the physico-chemical point of view, are devoid of biological activity and are mineralogically diverse (sands, clay, clays) which makes the fertility potential low, and the humus content also low.

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