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THE ECOLOGICAL RECONSTRUCTION AT COPȘA MICĂ, SIBIU COUNTY, A NECESSITY FOR A HEALTHFULL ENVIRONMENT

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Abstract

The paper studied the ecological reconstruction applied at Copsa Mica, Sibiu county. It is presented the forest which is administrated by the Forest District Mediaș situated in the Tarnave plateau especially. First, it shows the region's economic-forest specific and then the cause of degradation of large areas of forest vegetation.The total surface subject to ecological restoration through afforestation totals in Copsa Mica 644 ha, of which 470 ha forest fund and improvement perimeters outside the forest fund 174 ha. There are presented the main improvement and maintenance works of the land subjected to excessive pollution and the planting schemes used.

Key words**:** *ecological reconstruction, pollution, sustainable development*

INTRODUCTION

Forests managed by the Medias Forest District are located mostly in Sibiu, on the cadastral territory of the municipalities: Aţel, Axente Sever, Bazna Biertan, Blăjel, Dirlos, Micăsasa, Mihăileni, Moşna, Slimnic, Seica Mare Seica Mica Tărnava, Valea Viilor, Copsa Mica and Medias.

From a geographical point of view, these forests are located mostly in the Târnavelor plateau and only to a small extent Secașelor plateau.

The forest-economic specific of the region

The area is complex, industrial and agriculture around cities Medias and Copsa Mica and agrosylvicultural hills for the more remote areas. [8]

Forests in the area presented consist of nine management units numbered 1-5, 7-9, 11. [10, 13]

These forests , as an unit have been created in 1953 and 1954 in 4 M.U.F. - Sites Seica Mare, Valea Lungă, Medias. The rearrangement of the forests from this district was made in 1967, the district is divided into 13 U.P. sites. [9]

The entire surface of the Medias Forest District is framed in Group 1 functional absolute protection. The largest share is held by forests in areas with polluted atmosphere with a medium to excessive level, forests in areas with a low level of pollution in the atmosphere, forests on steep slope greater than 35 °. These forests were exposed to one of the most intense industrial pollution in Romania, due to the work of two businesses on the industrial platform Copsa Mica, SC Sometra S.A. and S.C. Carbosem S.A. Forms of land degradation identified in Copsa Mica are surface erosion which is manifested with different intensity. This form of degradation occurs in all degrees of intensity, from the most moderate to the most excessive. [3, 4] Land degradation processes with large amplitude are the movements of the ground and they are more common in the form of deep and large extension landslides. [1, 12]

In this context, the paper aimed to study the possibilities to reconstruct Copsa Mica area for a healthy environment.

MATERIALS AND METHODS

The work is based on literature review and ecological restoration works carried out in the forest area described above.

RESULTS AND DISCUSSIONS

The total area subjected to ecological restoration through afforestation work in intensely polluted territory of Copsa Mica

totals 644 ha, of which 470 ha forest fund and improvement perimeters outside the forest fund 174 ha.

The territory that is analyzed lies in the climatic region Transylvanian Depression, at the crossroads of western continental climate. [7]

The main maintenance works that were performed are:

-completing the cultures with species used in planting, with a preference for those that have the best grip percentage;

-the saplings reception immediately after planting , including the saplings planted to supplement crops;

-maintenance works of plantations consisting of revisions and hoeing.

Establishing the necessary saplings was made taking into consideration planting schemes and additioning procedures for afforestation on each composition and rescheduling planting areas. Everything comes from own nurseries.

Table 1. Ecological reconstruction works carried out in the perimeter Copsa Mica, Sibiu County, in the period 1998-2014

Type of works MU								**Total**
		1998-2002	2003-2014	**Total**	1996-1999	2000-2014	**Total**	
Full plantations	ha	168	302	**470**	68	106	**174**	**644**

Works carried out in the forest stock for its recovery: replacing dry forest through reforestation with species resistant to pollution which will return to the fundamental type of forest.

No species has given great results in the highly polluted areas, on deconstructed soils strongly affected by degradation processes. Most sensitive have proved to be the sapling spruce, black pine, maple and ash, even the locust that has survived a great number of years and had a small growth.

The first symptoms of pollution were observed on the parcel 7N from UP3, with a surface of 2 ha, located about 1.5 km from the pollution source-NE direction, where te old arboretum, aged 80 years has dried fully.

In order to prevent the erosion process on the rut line _ have been built about 150 wattles _ and for protection against grazing were built 4.6 kilometers of fencing wire mesh supported on concrete pillars.

Photo 1. Soil under ecological reconstruction at Copșa Mica, Sibiu county (original photo)

There have been built fences with an overall height of 40-50 cm, which dropped into the ground 15-20 cm and 25-30 cm above the ground. To ensure a longer lasting life, the stakes that have been used to build the fences, with a diameter of 6-8 cm, were made of oak.

In the last places with excessive erosion or torent, at the base of the ditches were littered willow branches, which entered into the vegetation and have contributed to increase the effect of land consolidation.

In the line of the strong strings the building of the fences was made in a V-shape, and to prevent their undermining at the cross of each runoff, has been stretched a perforated plastic foil arranged vertically over the entire height of the fence.

The administration of calcium amendments aims to increase over 5.8 the pH value of the polluted soils and the annihilation of the toxic effect of the heavy metals. It was used calcium carbonate, usually administered in the year preceding planting.

The administration of the amendments was made by spreading them over the entire terraces platform or over the fireplaces, on the ground, deployed at a depth of 25-30 cm.

In Copsa Mica was kept as a main species the acacia due to its outstanding qualities. It has a rapid growth in the early years, it is a good breeder of degraded lands and in addition it is considered one of the most resistant species to

sulfur dioxide and metals pollution.
As species of trees that mixed with acacia are Sălcioara, censer, Malin American, manna, and among shrubs have been chosen amorphous and hawthorn, which gave satisfactory results.
The maintenance works were carried out over 3-5 years, and starting with the first year there have been made mobilizations around the trees through annual seedlings and revising the made plantations.
The works to assist the natural regeneration were: soil mobilization on a surface of 84.3 ha, removal of existing seedlings and young hornbeam tree
Crop density formulas of acacia have been generally made with 6,700 seedlings per hectare and 625 poplar saplings (large) per hectare, high density, 1,000 seedlings per hectare was achieved for white underbrush.
Sea buckthorn is one of the most rustic and indicated species in the land fixing battle with extreme stationary conditions such as slopes, ravines and landslides. [5]

CONCLUSIONS

Based on experienc acumulated over more than three decades fighting to rebuild the stands destroyed of industrial pollution or creating new stands in the Copsa Mica, one can say that in terms of reduction of toxic fumes at the source, especially after 1990, there are viable solutions for (re) installation of forest vegetation. These works involve effort and high costs.
The species of trees that have achieved the best results in conditions to _ their ecological requirements are acacia (Robinia pseudacacia L.) willow (Eleagnus angustifolia L.), black hybrid poplar (Populus x canadensis Moench.), Malin American (Prunus serotonin Ehrh.), ash (Fraxinus excelsior L), and among shrubs, amorphous (Amorpha fruticosa L.), hawthorn (Crataegus monogyna Jack.) and in some situations, white underbrush (Hippophaë rhamnoides L.).
A requirement which must be taken into consideration is to avoid monocultures, especially when using the acacia as a baisc species (in which the mixture should be achieved as a group
In the case of new perimeters the new technical solutions must be based on a thorough mapping of the forested lands _ that cu¬prindă an analysis of the soils.
An important role on the success of plantations on lands affected by excessive erosion is the aidind works of construction and assembly such as fences an wattles.
The amending and the fertilization are mandatory operations, where the situation requires their application. They may be repeated every 2-3 years.
Amendments is better to be applied a year before planting.
The success of the action of ecological restoration will depend on full implementation of the requirements of environmental protection regarding the upgrade of the production processes and mounting _ depolluting instalations at the S.C. SOMETRA S.A., in a view to reducing the threshold of allowance of plants of concentration of all pollutants emitted. Soil toxicity - which will continue for many years to come - will be corrected with the help of calcium treatments and fertilizer.
The tree stands created will have a priority role for protection, their main aim being to combat and prevent degradation processes and revitalize the soils.
For the implementation of appropriate solutions it is necessary to follow up further executed work and conducting experiments on various species best suited to conditions, afforestation technologies that were adopted, the effect of amendments and fertilizers, etc. [2,6]
Regarding the ecological restoration of the polluted area Copsa Mica is very important that everyone involved in this large process to work together to bring local, national and community funds.

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