THE ESTABLISHMENTOF THE FOREST VEGETATION ON THE PERIMETER OF THE AMELIORATION HALDA VECHE - VALEA MARE

INSTALAREA VEGETAȚIEI FORESTIERE ÎN PERIMETRUL DE AMELIORARE HALDA VECHE-VALEA MARE

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Abstract: *Waste heap are the results of mining industries. Restoration project has the aim to consolidate the waste heap and the rehabilitation of environmental site. The perimeter of the amelioration found in the hill region with Quercus species. According with this region where the perimeter of the amelioration found there have been identified three different site units .For each site units there has been proposed afforestation solution. The solution considered species that are optimal for the area. The seedlings have been planted according to the specific of the land. The results obtained after first year of forest afforestation put in evidence that the technical solution adopted can contribute to create an optimal biocenose.*

Rezumat: *Haldele de steril sunt rezultatul activităților miniere din zonă. Reconstrucția haldei de steril are ca scop consolidarea sterilului minier şi refacerea echilibrului ecologic. Ținând cont de etajul deluros de cvercete, în care se regăseşte perimetrul de ameliorare şi de particularitățile haldei de steril au fost identificate trei tipuri de unități staționale şi au fost propuse soluții pentru instalarea vegetației forestiere. Rezultatele obținute după primul an de la instalarea vegetației forestiere au evidențiat faptul că soluțiile tehnice ce au în vedere specii care corespund condițiilor staționale şi modalități de instalare ce iau în considerare particularitățile terenurilor degradate pot contribui la crearea unor biocenoze optim structurate.*

Key words**:** *ecological affestoration waste heap afforestation.*
Cuvinte cheie: *reconstrucție ecologică, halde steril, împăduriri*

INTRODUCTION

Waste heap was generated because the storage of material results from mining industry. This waste heap is made from acid fragments of rocks, easy degradable, coarse grain. The residue from mining activities is stored on the slope hills.

The perimeter of the amelioration is found on the valley side of the Valea Mare River. It is generated from waste heap. At the moment, on this site unit there is forest vegetation on 50% from the land. The vegetation is constituted from *Hippophaë rhamnoides, Eleagnus angustifolia,* and few samples of *Robinia pseudacacia, Pinus nigra and Quercus robur. This vegetation doesn't assure the stabilization of the waste heap and this is the reason why affstoration of the land is necessary.*

MATERIALS AND METHOD

There have been made o lot of observation on the. The waste heap was generated because of coal residue mining industry stored of the land.

In order to characterize the environmental site of waste heap there have been considered general climatic conditions, the source of mining material like a result of copper exploitation and the characteristic of waste heap stores.

The regeneration has been watched in samples placed schematic on the land.

For all sites there has been delimited 200 mp circular control area. For sites bigger than 5ha, the control areas represent 4% from the site and for the sites smaller than 5ha the control area represents 8% from the site. For each control site there has been made an inventory of the seedlings. There has been calculated the survival percent of seedlings in order to establish the next necessary activities.

RESULTS AND DISCUSSION

On the study waste heap there has been forest vegetation in percent of 50% from the land. The vegetation is composed from *Eleagnus angustifolia, Hippophaë ramnoides, Pinus nigra, Robinia pseudacacia and Quercus robur.* The observations made put in evidence the good vegetation of *Eleagnus angustifola* and *Hippophaë rammnoides.* We can say the same about *Pinus nigra* with observation that the specie appears isolated.

The perimeter of the amelioration Halda Veche - Valea Mare is located in the hilly altitudinal plant belt with *Quercus* species. The source of component material resulted from cooper mining activities gives the characteristics of waste heap store: coarse material, sand mixture, loess and very little soil. Considering these aspects there has been separated the next site units in the perimeter of the amelioration (table 1):

S1 – waste heap slope, more than 25%, from hilly altitudinal plant belt with *Quercus* species with acid rocks, coarse and medium grain, oligomesotrophic, oligomesohydric, dry in summer, covered in percent of 50% with forest vegetation like a result of afforestation with *Eleagnus angustifolia, Hippophaë ramnoides, Pinus nigra* and *Robinia pseudacacia*.

S2 – waste heap erosion slope, more that 25%, from hilly altitudinal plant belt with *Quercus* species, with acid rocks, coarse and medium grain, oligomesotrophic, oligomesohydric, moist dry in summer.

S3 – the top of the waste heap from hilly altitudinal plant belt with *Quercus* species, with acid rocks, coarse grain, partial with grace oligomesotrophic**,** moist - dry in summer, covered more that 50% with woody plants.

Table 1

The sites of from waste heap

Site unit	Surface (ha)	Observation
S1	17,20	Stabilized waste heap slope with more that 50% covered by woody plants
S2	3,50	Waste heap slope with erosion
S3	19,80	The top of waste heap, covered more than 50% with woody plants

The technical solution adopted for this perimeter of the amelioration consisted in afforestation. The seedlings were planted in hole with extra soil, 10dl soil for each hole. On the top of the waste heap and on the slopes we used 5000 seedlings for each hectare. The unstable slope has been consolidated with fences from 3 meter to 3 meter. After that consolidate action the seedlings were planted (table 2).

The observations were made about regeneration in control areas. There have been establishing 200 mp circular control area. The control areas have been delimited schematic on the perimeter of the amelioration. For S_2 site unit the control areas represent 8% from the site and for the site units S_1 and S_3 the control areas represent 4% from the sites. For each

control site there has been made an inventory of the viable, well developed with active growth seedlings. The observations were extending to the hectare.

Table 2

Technical solution

Site unit	Total surface (ha)	Effective surface (ha)	Land preparation	Afforestation formula	Number of seedlings
S_1	17,20	8,60	-	50%Pin 25% Sc 25%Ct (Mj, Lc, Sl, Ll)	5000
S_2	3,50	3,50	Tg	30%Pin 17% Sc 53%Ct (Mj, Lc, Sl, Ll)	6700
S_3	19,80	9,90	-	8%Pin 30% Sc 62%Ct (Mj, Lc, Sl, Ll)	5000

- Pin – *Pinus nigra*
- Sc – *Robinia pseudacacia*
- Ct – *Hippophaë ramnoides*
- Mj – *Fraxinus ornus*
- Lc – *Ligustrum vulgare*
- Sl – *Eleagnus angustifolia*
- Ll – *Syringa vulgaris*

Table 3

The regeneration control

Site unit	Effective surface (ha)	No. of control area/ surface.(m^2)	U.M.	Planted seedlings Existing seedlings			Total seedlings
				Pinus nigra	Robinia pseudoacacia	Shrubs	
S_1	6,0	12/2400	Nr	2500	1250	1250	5000
				1995	1012	1016	4023
			%	100	100	100	100
				80	81	81	81
S_2	3,5	14/2800	Nr	2010	1139	3551	6700
				1560	942	2728	5730
			%	100	100	100	100
				78	82	77	78
S_3	3,28	13/2600	Nr	400	1500	3100	5000
				319	1192	2400	3911
			%	100	100	100	100
				79	80	77	78

CONCLUSIONS

Ecological restoration involved a complex of actions in order to create an optimal biocenose according to environmental site. Forest ecosystems are the capacity to become very fast a balanced ecosystem. In order to this fact forest ecosystems can perform the protective and production functions.

The afforestation in the perimeter of the amelioration Halda Veche – Valea Mare put in evidence that species used and technical solution adopted assured a 78-81% survival percent. This is a very good percent of survival for the first year of afforestaton. In the next years there

will be necessary a 10% seedling to complete the afforestation and also a lot of actions to take care about the forest vegetation.

Waste heap afforestation will contributed to consolidate the coal residue and to stop this material to arrive in the Valea Mare River. In this way the aquatic flora and fauna will be protected. The ecological balance will be repaired by biodiversity restored. The afforestation is important in order to improve the beauty of the landscape and also to obtain wood material.

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