THE INFLUENCE OF THE FOREST VEGETATION FROM THE MINING FIELDS IN MOLDOVA NOUĂ ON THE MICROCLIMATE CHANGES

CERCETĂRI PRIVIND INFLUENȚA VEGETAȚIEI FORESTIERE INSTALATĂ PE HALDELE DE STERIL DE LA MOLDOVA NOUĂ ÎN MODIFICAREA MICROCLIMEI. SINTEZE

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Abstract: *In this paper we studied the microclimate changes due to forest vegetation on the coal residue areas at Moldova Noua shore.*

Rezumat: *În această lucrare sunt studiate modificările microclimatice produse ca urmare a instalării vegetației forestiere pe haldele de steril de la Moldova Noua*

Key words**:** *mining fields, microclimate changes, microclimate areas, fertilizing resources, environmental protection*
Cuvinte cheie: *halde de steril, modificări microclimatice, areale microclimatice, resurse fertilizante, protejarea mediului*

INTRODUCTION

The forest microclimate is a complex phenomenon which modifies in a widely manner all the climate parameters (it is about a „climate re-synthesizing", the ambiance being forest vegetation favourable "modeled". The main elements concerned are: density of the forest vegetation, vertical structure, ecological character of the species, horizontal structure, age etc).

It is to be noticed the attenuation of the thermic extremes, modification of the aerohidric parameters, solar radiation, wind intensity and evaporation degree reduction as well, which provide a favourable "forest vegetation specific frame" for the animals and plants. People also appreciate the forest, not only for the beauties, but also for the shelter dimension provided.

On the exterior side, the forest influence (depending on the nature of its limits which stop the air stream and modifies the radiation spectrum) is to be seen at a larger scale, meaning that it is integrated in a general atmosphere circulation mechanism as a individual part (the influence of the forestry ecosystems over the global climate genesis).

The climate parameters mostly influenced by the forest are as follows: solar radiation, oxygen amount in the atmosphere, carbon bioxide absorbed etc, so that we can say that big forest surfaces play a superior role in global climate than other vegetation structures.

MATERIALS AND METHOD

One of the main goals of the researches was to highlight the microclimate changes due to forest vegetation on the coal residue areas at the Danube shore. In order to establish the nature of these changes, we resorted to observation (instrumental and visual), the observation points being situated in to two representative dimensions: tree bushes and naked land.

The meteorological elements were:

- air temperature: 0, 25, 150 cm above the soil

- soil temperature: 5, 10, 15, 25 cm depth
- atmosphere humidity: 25, 150 cm above soil
- speed and wind direction: 200 cm above soil
- light intensity: 150 cm above soil
- potential evaporation: 10 cm above soil.

In the same time, observations over the weather have been made.

In order to highlight the general aspects of the main meteorological elements and study their fluctuation as well, the measurements have been done as seen in figure no. 1.

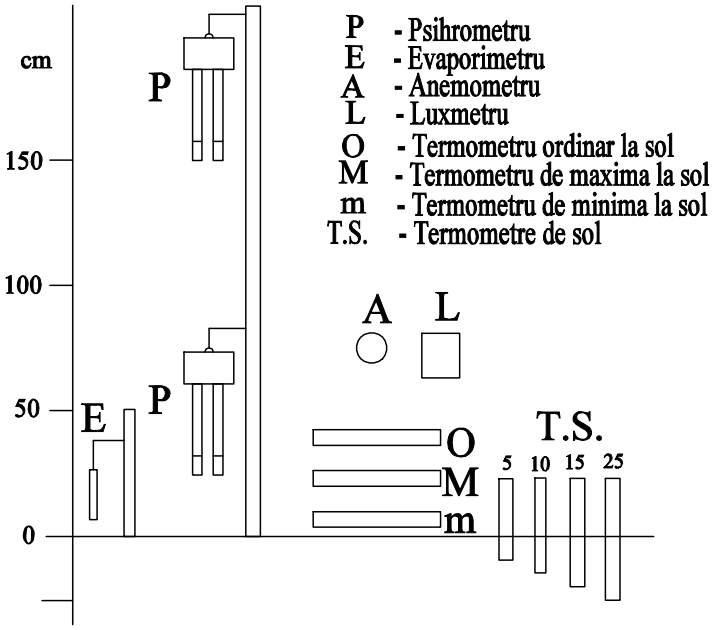

Figure 1. – Station equipment

MICROCLIMATE SYNTHESIS

AIR TEMPERATURE VARIATION

- The thermo studies highlighted some fundamental variation types:
- The variation space is different from case to case and is one step bigger on the south slope than the rest of the plateau.
- The variation type is stressed on the south slope, has big values on the plateau and little ones on the north slopes.
- The variation shape\aspect is the most significant element, which defines the two types of fito-climat.

MICROCLIMATE AREAS

In order to highlight the differences and the characteristic nature of the fito-climate types, we used the GIROLAMO AZZI system (1960) and discovered a few axial repartition patterns (depending on biotope, vegetation structure and season):

- Balanced fito-climate with an almost equal distribution in all sectors.

- Unbalanced fito-climate with an unequal distribution, especially orientated to warm-dry and cold-wet axis.
- Unbalanced fito-climate with a strong development of the cold-wet axis.
- South slope topo-climate with an even distribution in the warm-dry, cold-dry and cold-wet axis and absence in the warm-wet one.
- Plateau topo-climate with an even distribution in warm-wet, warm cold-dry and cold cold-wet axis and absence in the cold cold-dry one.

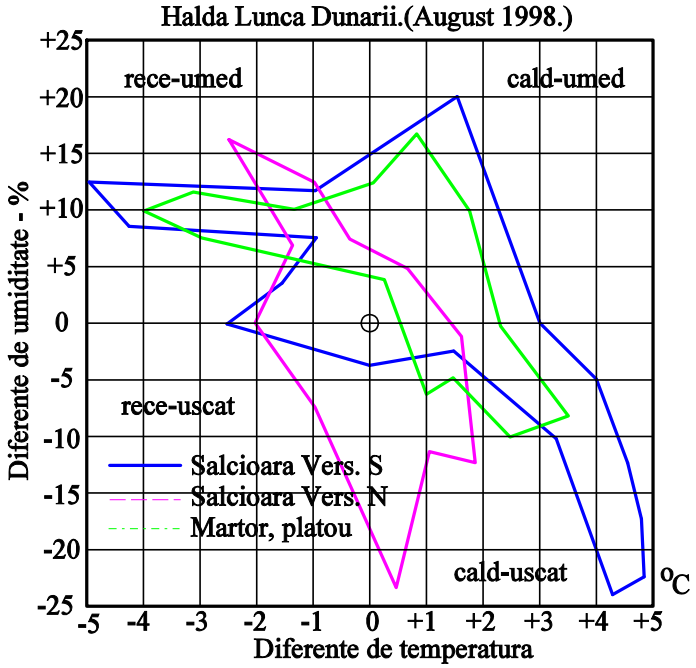

Figure 2. - Microclimatic sectors; point 0 = T 24, 50 C, U 62%

Dynamically speaking, topo cold-climates are mostly balanced, having a warm-dry and cold-wet axis distribution, while fito-climates have the same distribution, strongly lengthened.

In comparison to the plateau, the microclimate polygons move to the right, in the warm sector (0, 5-1, 5 thermohydric steps), besides the north slopes which move conversely, towards the cold sectors. Super positions are partial and little. There is a clear difference between the fito and topo-climates, which move in the same direction as highlighted above, but at greater distances.

The general climate back-ground influenced by the forest vegetation on the coal residue areas is a hydro slightly unbalanced one, due to the mining fields conditions and mezoclimate (general climate), the latter being distorted by the total lack of warm-wet and cold-dry sectors.

The fito-climate influence is more stressed on the warm-dry and cold-wet axis and less important on warm-wet and cold-dry ones.

Under the influence of the forest-vegetation from the coal residue area, the microclimate gets a really genuine forest touch, different from the one of the naked soil.

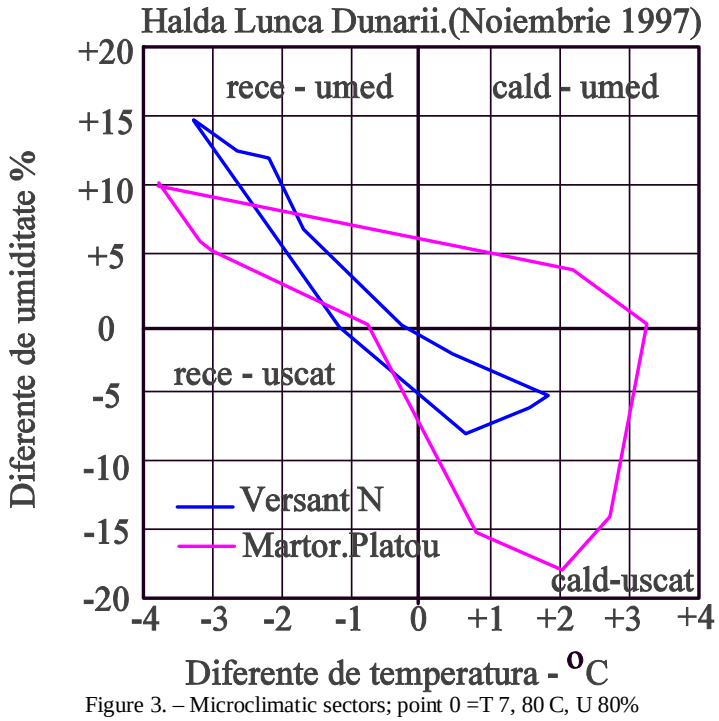

Figure 3. – Microclimatic sectors; point 0 =T 7, 80 C, U 80%

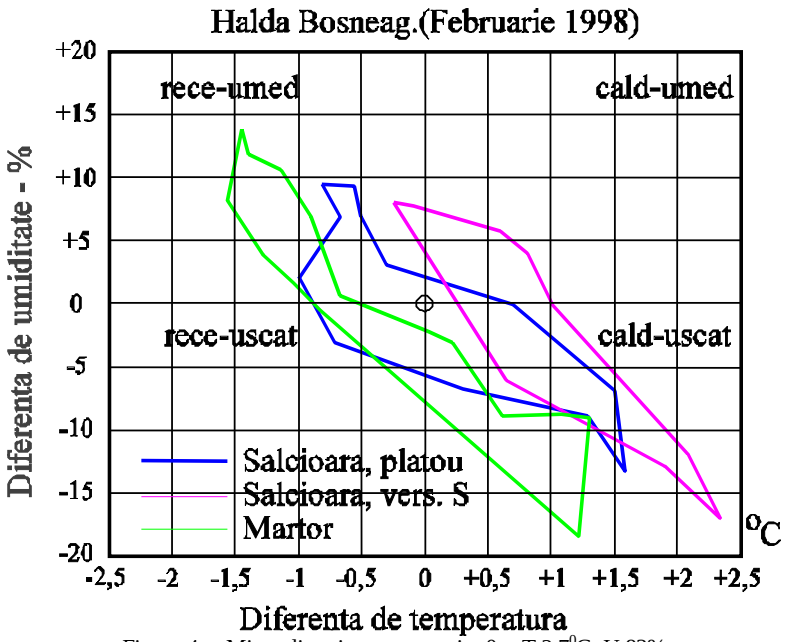

Figure 4. – Microclimatic sectors; point 0 = T 2,7^{0}C, U 83%

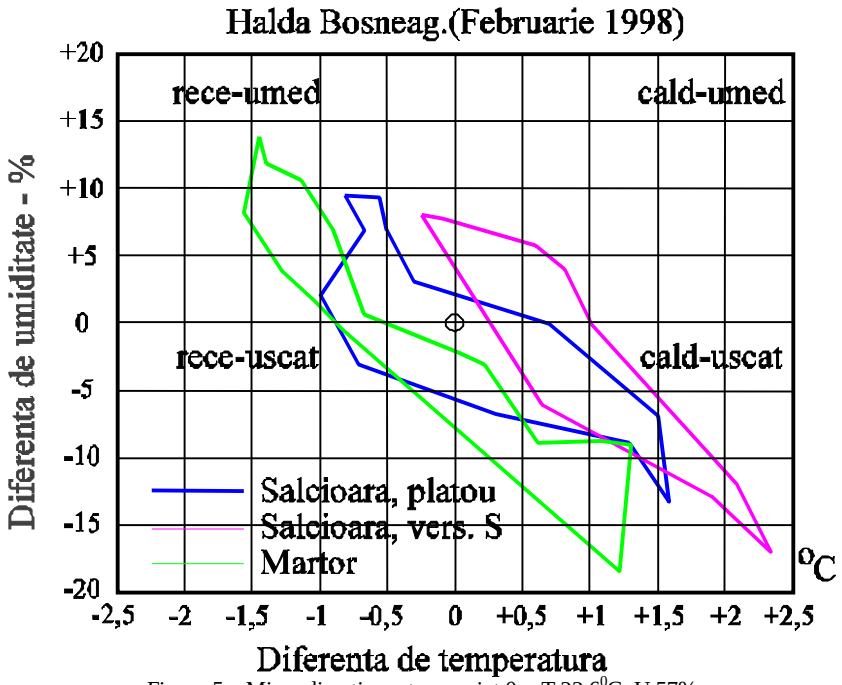

Figure 5. –Microclimatic sectors; point 0 = T 22,6^{0}C, U 57%

Table 1

Marimea sectoarelor microclimatice de pe halde, in reprezentate tip Girolamo Azzi

Biotopul (fitocenoza)	Medii diurne		Aria (ponderea) sectoarelor, %			
	Temperatura aerului ^{0}C	Umiditatea atomosferica %	cald-uscat	cald-umed	rece-uscat	rece-umed
A. Halda Lunca Dunarii. August 1998						
Platou. Martor	24,3	62	26	48	0	26
Vers.S.Salcioara	24,1	66	31	39	3	27
Vers.N.Salcioara	23,6	68	35	16	23	27
B. Halda Lunca Dunarii. Noiembrie 1997						
Platou-Martor	8,6	76	53	19	3	25
Vers.n.Salcioara	6,9	84	32	0	15	53
C. Halda Bosneag. August 1998						
Platou. Martor	21,8	56	48	0	30	22
Platou.Salcioara	22,2	59	38	15	5	42
Vers.S.Salcioara	23,8	56	55	2	8	35
D. Halda Bosneag. Februarie 1999						
Platou. Martor	2,1	85	46	0	23	31
Platou.Salcioara	2,7	83	51	4	19	26
Vers.S.Salcioara	3,6	80	66	29	0	5

The thesis is not contradicted by the fact that on the south slopes the positive effects are not so strong visible, they will appear in a short time, as soon as the forest vegetation will grow and the “biocenozare” process will intensify as well.

CONCLUSIONS

One of the most important effects due to the forest vegetation from the coal residue areas is the climate change. Unlike other areas, the effects are visible (shadow, coolness, thermohydro homogeousness etc).

For the time being, we can talk about a veritable forest fito-climate which is not yet completely accomplished in its evolution towards maturity.

LITERATURE

1. AZZI, GIROLAMI., 1960: Elementi di ecologia agrarian. In volumul omagial "G. Ionescu Sisesti – Probleme actuale de biologie si stiinte agricole." Editura Academiei Romane, Bucuresti
2. CIORTUZ, I., 1981: Amelioratii silvice. Editura Didactica si Pedagogica, Bucuresti
3. TARZIU, D., 1985: Pedologie si statiuni forestiere. Reprografia Universitatii. Brasov
4. TRACI, C., 1985: Impadurirea terenurilor degradate si valorificarea lor pe cale forestiera. Editura Agrosilvica, Bucuresti
5. TRACI, C., 1985: Impadurirea terenurilor degradate. Editura Ceres. Bucuresti