# ECOLOGICAL RECONSTRUCTION OF BANAT'S GRASSLANDS DEGRADED BY NATURAL AND ANTHROPIC FACTORS

# RECONSTRUCȚIA ECOLOGICA A PAJIȘTILOR DEGRADATE DE FACTORII NATURALI SI ANTROPICI DIN BANAT

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***Abstract:*** *The researches for this work are realised in two grassland from Timiş County: one of them is affected by flooding (Foieni) and the other is affected by soil salinity (Saravale). There were realised two experiences with fertilisation applied on grasslands. In the establishment of grasslands fertilization system is necessary take in account the botanical composition, the physico-chemical features of the soil covered with grass, concurrent species needs, temperature and humidity conditions from summer time, forage use and economic conditions in that area.*

***Rezumat:*** *Cercetările pentru această lucrare sunt realizate pe două pajişti din județul Timiş : una dintre ele afectată de inundare (Foieni) şi alta afectată de sărăturarea solului (Saravale). Astfel s-au realizat două experiențe de fertilizare aplicată pe pajişti. În stabilirea sistemului de fertilizare la pajişti este necesar a se ține seama de componența floristică, de proprietățile fizico-chimice ale stratului de sol înierbat, de cerințele speciilor concurente, de condițiile de temperatură şi umiditate din cursul verii, de modul de folosire a ierbii cum şi de condițiile economice ale zonei respective.*

***Key words*****:** *degraded grassland, ecological reconstruction, natural factors, anthropic factors.*
***Cuvinte cheie***: *pajişti degradate, reconstrucție ecologică, factori naturali, factori antropici.*

## INTRODUCTION

All the natural grasslands, primary or secondary, today are influenced by humans and their animals. From this cause natural grassland notion lose the entire sense, and the pratologists have introduced *permanent grassland* term, without the exclusion of natural grassland term. Permanent grassland defines grassland indifferent by its origin or succession degree, where vegetation is settled spontaneously. The main characteristic of the grasslands united in this category is the vegetation permanence.

## MATERIAL AND METHOD

The researches for this work are realised in two grasslands from the Timiş County: one is affected by flooding (Foieni) and other affected by soil salinity (Saravale).

There were realised two experiences with fertilisation applied on grasslands during the 2005-2006 period).

Both experiences are set after blocks method, and the surface of a plot is 20 $m^2$ (4m x 5m). The repetitions number is five and the variants number is 10.

Fertilizers doses used for Foieni grassland are next:

1. control ($N_0P_0K_0$) – 0 g
2. $N_{100}P_0K_0$ - 588 g ammonium nitrate;
3. $N_{200}P_0K_0$ – 1176 g ammonium nitrate;
4. $N_{200}P_{50}K_0$ – 500 g NP + 882 g ammonium nitrate;
5. $N_{200}P_{50}K_{50}$ – 500g NPK + 882 g ammonium nitrate;
6. $N_{50+50}P_0K_0$ – 294 g ammonium nitrate + 294 g nitrogen applied fractioned;

7. $N_{100+100}P_0K_0$ - 588 g ammonium nitrate + 588 g nitrogen applied fractioned;
8. $N_{100+100}P_{50}K_0$ – (500g NP + 294 g ammonium nitrate) + 588 g ammonium nitrate;
9. $N_{100+100}P_{50}K_{50}$ – (500 g NPK +294 ammonium nitrate) + 588 g ammonium nitrate;
10. $N_{100+50+50}P_{50}K_{50}$ - (500 g NPK +294 ammonium nitrate) + 294 ammonium nitrate + 294 ammonium nitrate.

Experience from Saravale is set after subdivided blocks method. The surface of a block is split in two: one amended with phosphogips (10 t/ha) and the other half isn't amended. Fertilizers doses used for Saravale grassland are next:

- Control ($N_0P_0K_0$) – 0 g;
- $N_{100}P_0K_0$ - 882 g ammonium nitrate;
- $N_{200}P_0K_0$ – 1764 g ammonium nitrate;
- $N_{200}P_{50}K_0$ – 750 g NP + 1323 g ammonium nitrate;
- $N_{200}P_{50}K_{50}$ – 750 g NPK + 1323 g ammonium nitrate;
- $N_{50+50}P_0K_0$ – 441 g ammonium nitrate + 441 g nitrogen applied fractioned;
- $N_{100+100}P_0K_0$ - 882 g ammonium nitrate + 882 g nitrogen applied fractioned;
- $N_{100+100}P_{50}K_0$ – (750 NP + 441 g ammonium nitrate) + 882 g ammonium nitrate;
- $N_{100+100}P_{50}K_{50}$ – (750 g NPK + 441 ammonium nitrate) + 882 g ammonium nitrate;
- $N_{100+50+50}P_{50}K_{50}$ - (750 g NPK +441 ammonium nitrate) + 441 ammonium nitrate + 441 ammonium nitrate.

Grasslands yields are determined for an exploitation cycle with repeated cuttings method. Also there is realised a short overview of the vegetation.

## RESULTS AND DISCUSSIONS

### *Saravale grassland*

Grassland analysed in Saravale is low productive, this being dominated by *Puccinelia limosa, Achillea setacea* and *Artemisia santonicum* these forming the main coeno-taxonomic units.

The vegetation characterisation is represented in the next synthetic vegetation table (table 1).

*Table 1*

Synthetic vegetation table from Saravale (altitude 91m)

| No. | Species | Autoecologic index | | | Abundance - Dominance (1-5) | Coverage. (%) |
|---|---|---|---|---|---|---|
| | | T (1-9) | U (1-10) | R (1-9) | | |
| ***Poaceae (Gramineae)*** | | | | | | |
| 1 | *Puccinelia limosa* | 3.5 | 0 | 5 | 5-3 | 75.5 |
| 2 | *Bromus hordeaceus* | 0 | 3 | 0 | ±1 | 10.5 |
| 3 | *Poa bulbosa var. vivipara* | 2 | 3.5 | 4 | ±1 | 0.5 |
| 4 | *Cynodon dactylon* | 3.5 | 3.5 | 0 | + | 0.3 |
| ***Fabaceae (Leguminosae)*** | | | | | | |
| 5 | *Trifolium striatum* | 1.5 | 3 | 4 | ±1 | 1.5 |
| ***Species from other botanical families*** | | | | | | |
| 6 | *Camphorosma annua* | 4 | 4 | 5 | ±1 | 1.5 |
| 7 | *Chamomila recutita* | 3 | 3.5 | 0 | + | 0.3 |
| 8 | *Ranunculus pedatus* | 3 | 3 | 4 | + | 0.3 |
| 9 | *Thlaspi arvense* | 3 | 3 | 4 | + | 0.3 |
| 10 | *Plantago tenuiflora* | 3.5 | 3.5 | 5 | + | 0.3 |
| 11 | *Limonium gmelini* | 3.5 | 4 | 4 | + | 0.3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12 | *Artemisia santonicum* | 2.5 | 4 | 0 | + | 0.3 |
| 13 | *Plantago schwarzenbergiana* | 3.5 | 4 | 5 | + | 0.2 |
| 14 | *Mentha pulegium* | 3 | 3 | 5 | + | 0.3 |
| 15 | *Cerastium dubium* | 3 | 3 | 0 | + | 0.2 |
| 16 | *Aster tripolium* | 0 | 0 | 5 | + | 0.1 |

Vegetation has coverage of 92.4% on soil surface. The dominant species is *Puccinelia limosa*, we also find a increased percentage of *Bromus hordeaceus, Poa bulbosa var. vivipara, Trifolium striatum, Camphorosma annua.*

The vegetation carpet of this grassland is formed from 16 species from that 25% are represented by grasses, 6% are *Cyoperaceae* and *Juncaceaae*, and also 6% are legumes, ant the other 69% are represented by species from other botanical families.

The yield results are showing a minimal difference in comparison with the control. The greatest yield values are obtained on the background of the variants with mixed fertiliser doses (NPK), this fact being represented in figure 1.

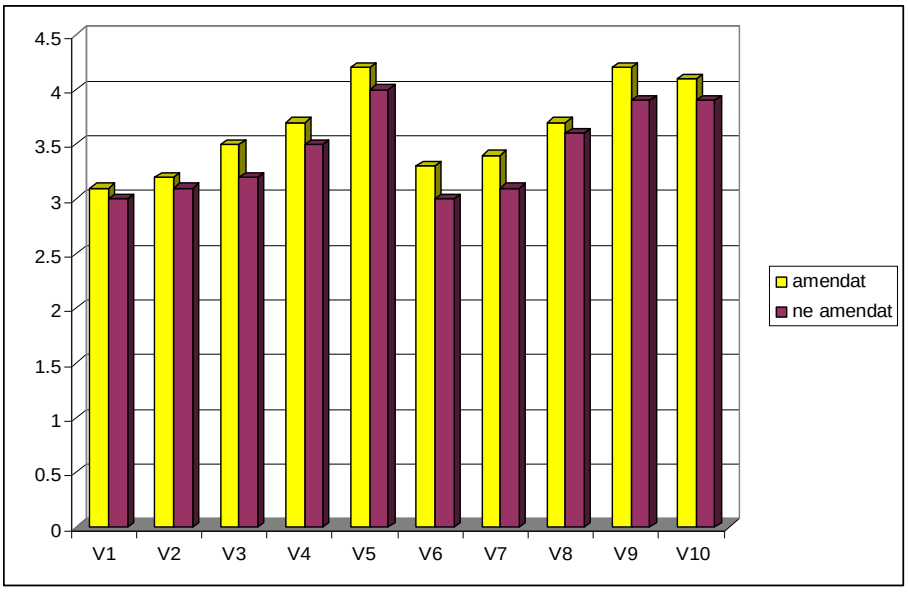


Figure 1 Graphic representation of the yields obtained on Saravale grassland

Also, from this representation we can notice a lower yield in the case of all the variants not amended with phosphogips.

***Foieni grassland***

Foieni grassland is one of the Banat's surfaces that were affected by flooding soil surface being covered with water about two months. This fact has determined the change of the initial vegetation carpet, in this days this being dominated by species as are *Echinochloa crus-galli, Xanthium strumarium* and *Cynodon dactylon.* Next is represented the synthetic vegetation table for Foieni (table 2).

*Table 2*

Synthetic vegetation table from Foieni (87 m altitude)

| No. | Species | Autoecologic index | | | Abundance - Dominance (1-5) | Coverage. (%) |
|---|---|---|---|---|---|---|
| | | T (1-9) | U (1-10) | R (1-9) | | |
| ***Poaceae (Gramineae)*** | | | | | | |
| 1 | *Cynodon dactylon* | 3.5 | 1.5 | 0 | 5-3 | 88.2 |
| 2 | *Agropyron repens* | 0 | 2.5 | 0 | ±1 | 6.1 |
| 3 | *Echinochloa crus-galli* | 0 | 3.5 | 2.5 | ±1 | 1.3 |
| 4 | *Hordeum murinum* | 3.5 | 2 | 0 | ±1 | 1.4 |
| ***Juncaceae and Cyperaceae*** | | | | | | |
| 5 | *Juncus effusus* | 2.5 | 3.5 | 0 | + | 0.6 |
| ***Species from other botanical families*** | | | | | | |
| 6 | *Rumex crispus* | 2.5 | 3 | 0 | + | 0.3 |
| 7 | *Polygonum persicaria* | 3 | 5 | 0 | + | 0.3 |
| 8 | *Xanthium strumarium* | 3.5 | 2.5 | 0 | ±1 | 0.3 |
| 9 | *Conyza canadensis* | 0 | 2 | 0 | ±1 | 1.2 |
| 10 | *Ranunculus acris* | 0 | 0 | 0 | + | 0.1 |
| 11 | *Taraxacum officinale* | 0 | 2.5 | 0 | + | 0.2 |

Vegetation covers 100% the soil surface. The dominant species is *Cynodon dactylon.* In the same time we find there in increased percentage *Agropyron repens, Echinochloa crus-galli,, Hordeum murinum, Xanthium strumarium* and *Conyza canadensis.*

The vegetation covers of this grassland is containing 11 plant species and from these 32% are grasses, 9% are *Juncaceae*, and the other 59% are represented by plant species from other botanical families. In this grassland legumes are absent because the water table is still neat to the surface, this fact affecting the soil air capacity.

The productivity of flooded grassland is influenced by the application moment and fertilizers doses. In this way, the best results are obtained in $N_{200}P_{50}K_{50}$ variant (V5) (figure 2).

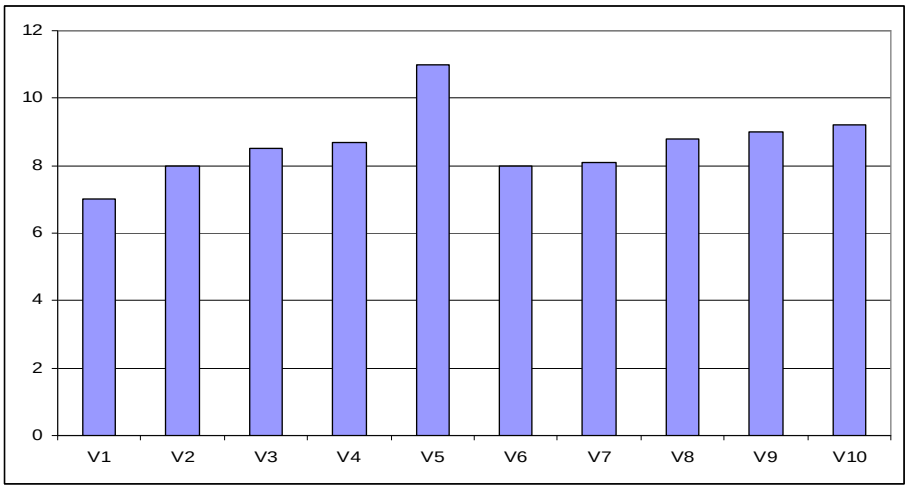


Figure 2 Graphic representation of the yields obtained on Foieni grassland

## CONCLUSIONS

After the analysis of obtained results we have obtained the next conclusions:

- on both grassland are well represented the species from other botanical families 69% (Saravale) and 59% (Foieni);
- green mass yield results are showing a minimal difference in comparison with the control in Saravale grassland; the greatest yield values is obtained on the background of the variants with mixed fertiliser doses (NPK);
- the productivity of Foieni grassland is influenced by the application moment and fertilizers doses; thus the best results are obtained in $N_{200}P_{50}K_{50}$ variant (V5).

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