APPROACHES ON THE BIODIVERSITY OF PERMANENT UNDEREXPLOITED GRASSLAND IN BANAT

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Abstract: *These last years, in Romania, the management of semi-natural grasslands has become more and more deficient, while most of them were abandoned. Raising animals on private farms has become a rare practice, which led to a decrease of the grazing pressure on semi-natural grassland. Abandonment of the grassland surfaces represent a great problem among entire Europe, prevalent in the higher areas, one of the reason being and the decrease of the number of animals have marked the dynamics of vegetation and biodiversity. Also there appeared a deep change in the quality and productivity of the vegetation cover. Knowing the dynamics of vegetation on pastures has become important in ecology, since pastures are one of the most important sources of food for both wild and domestic animals. The goal of the paper is to point out the effects of under-exploitation on biodiversity on some semi-natural grassland in Banat. The study took place in Western Romania in the hills of Surduc which are situated at the bottom of the Poiana Rusca Mountains, east from the Bega – Luncani River and north from the terraces of the Bega River. We studied three semi-natural grasslands which we observed for five years (2005-2009). The floristic composition was determined with the double meter (linear) method, and biodiversity was determined with the Shannon-Weaver index and the results were processed on the ground of the botanical sampling. The statistical method used was the analysis of the correlations a. As a conclusion, we can say that the dynamics of vegetation has a well-defined trend and that the biodiversity index has suffered changes year after year. That is why our goal to continue this study is to notify the specialist regarding implementation of some rehabilitation measurements for the biodiversity of these half natural pasture*

Key words: *grasslands , biodiversity index, management*

INTRODUCTION

The goal of the present paper is to point out the effects of under-exploitation on the dynamics of vegetation and biodiversity.

The Eurpean Union has agreed to reduce biodiversity loss by 2010. Land use change can cause important modifications in biodiversity. Biodiversity is an important issue in promoting agricultural sustainability, and depends on vegetation management. (FERNANDEZ-NÚÑEZ E. *et al* 2009).

Biodiversity loss is of increasing concern to society, scientist and policymaker. People care about loss of species for intrinsic reasons, but there is accumulating evidence that loss of biodiversity will also have major impacts for ecosystem functions and services, and hence for human well-being (MILLENNIUM ECOSYSTEM ASSESSMENT 2005, DIAZ *et al.* 2006, in BAILLIE J.E.M. *et al*. 2008). At the same time, other environmental changes, such as climate change, invasive species, or disease will interact with biodiversity loss in ways that could increase the negative impact (MILLENNIUM ECOSYSTEM ASSESSMENT 2005, in BAILLIE J. *et al.* 2008) Diversity is a keyword for grasslands and grassland-based systems in Europe. It is induced by the variability of the ecological condition (soil, climate), species composition, use, management system and performances. (PEETERS A 2008)

MATERIAL AND METHOD

The study took place in Western Romania in the hills of Surduc which are situated at the bottom of the Poiana Rusca Mountains, east from the Bega – Luncani River and north from the terraces of the Bega River. The south borderline towards Poiana Rusca follows the alignment of the Crivna, Hauznesti, Gladna, Zolt, Tomesti towns; the boundary is formed by the Valley of Sasa River up to Crivna de Sus. The connection with the mountains is made through an abrupt unevenness and through a series of valleys. The vegetation was determined by means of the linear method (Daget and Possonet, 1971) the observations were made on five permanent sample plots on each of the three analyzed pastures. Biodiversity was estimated with the help of the Shannon-Weaver Index. The three analyzed pastures are located near Lake Surduc, each of them being placed as follows: the pasture of *Festuca pratensis* Huds., 123 m a.s.l. with exposition to south-east, the pasture of *Lolium perenne* L. and *Trifolium repens* L. 198 m a.s.l. and the pasture of *Agrostis capillaris* L. 290 m a.s.l. with north-west exposition. As for the monitoring of the management with a view to the quantification of the use of this three permanent pasture, we allotted points as follows: 1 point for harvesting the entire aerial parts of the plants upon the mowing. In occasional grazing, we could see that they sued only certain animal species, and allotted 0.5 points, while abandonment was granted 0 points. On the ground of these considerations, the management of the pastures was quantified as follows: *Festuca pratensis* Huds. grassland (FPG) in 2005-2006 the pasture was mowed twice and occasionally grazed, and was granted 2.5 points; in 2007, the pasture was mowed once and was granted 1.5 points; in 2008-2009 the pasture was abandoned because the owner fenced it and limited access to the pasture, which granted it 0 points for both of the years; *Lolium perenne L* and *Trifolium repens* L. grassland (LP TRG) in 2005-2006 was mowed once in each year, was garanted 1 point, in 2007-2009 was grazed and was granted 0.5 point; *Agrostis capillaris* L grassland (ACG) The statistic method we used was correlation analysis.

RESULTS AND DISCUSSIONS

Permanent grassland plays an important role in the protection of soil, water, air, and landscape and in maintenance biodiversity of agricultural areas. (JANKOWSKA –HUFLEJT H., 2006, KOPEC, 1999, cited by JANKOWSKA –HUFLEJT H. *et al* 2009).

After sampling we could see that the biodiversity index decreasing year after year. In 2005 we can see that the pastures (FPG and LP TRG) are characterised by a medium biodiversity but the ACG is characterised by a high biodiversity. The dynamics of biodiversity index is illustrated in figure 1.

Agrostis cappilaris L. pasture is characterized by a medium biodiversity, Biodiversity index value decrease from 4.1 to 3.6 being attributed to climatic conditions and management, probably being favored species as *Juncus conglomeratus* L. Hiperycum perforatum L. whose dynamics is growing.

In the *Lolium perenne* L. and *Trifolium repens* L. pasture only some bushes of *Holcus lannatus* L. were detected in 2005 but became the dominant species together with *Calamagrostis arundinacea* L. in 2009. In the *Lolium perenne* L. and *Trifolium repens* L. pasture the biodiversity index was 3.9 in 2005 and dropped to 2 in 2009 entering the category of pastures with a low biodiversity loosing *Vicia villosa* L..

As for the analysis of the relation between biodiversity and management, we can say that there is a positive correlation $r = 0.93$, $r = 0.92$, $r = 0.9$ between the two variables, which shows clearly that occasional grazing and abandonment leads to a reduction in biodiversity. Figure 2

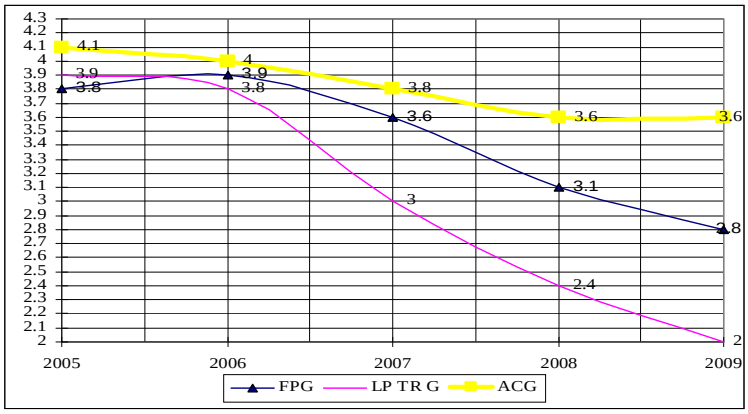

Figure 1. Dynamics of biodiversity index

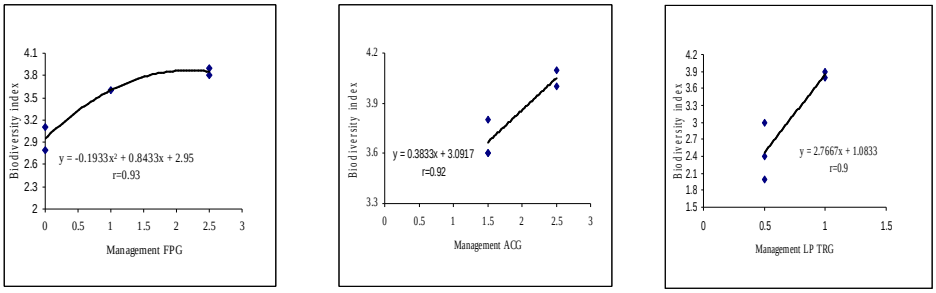

Figure 2 Relation between management practices and biodiversity index

The changes in intensity and time of mowing and grazing resulted in changes of the floristic composition and, later, in the way the ecosystem functions (Backler 1989, Milchunas and Laurenroth 1993, Diaz *et al.*, 2007, Klimešovà *et al.*, 2008 cited by Durău C.C. *et al* 2009). This is how we could explain the great interest in the monitoring of mowing and grazing on vegetal communities with a view to preserving biodiversity, economic value, and aesthetic value (Klimešovà *et al*. 2008 cited by Durău C.C. *et al* 2009).

CONCLUSIONS

Restricting occasional grazing and diminishing the number of mowing until abandonment in the last two years resulted in a certain trajectory of the dynamics of biodiversity index.

In Romania, but especially in the selected area (Banat, Surduc Hills) studies regarding the dynamic of vegetation and also aspects regarding biodiversity are still in an initial phase. Also monitoring the management of these semi-natural pastures especially grazing is difficult because rational mowing is not practised. The new land owners and the remaining livestock farmers do not yet consider management problems and the maintenance of biodiversity having a priority.

Therefore our intention to continue this study is to notify the specialists regarding the implementation of rehabilitation measurements to maintain biodiversity of these semi-natural pastures.

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