The Influence of Different Type of Management upon the Floristic Structure of Grasslands Systems, with Special Attention on Arnica montana L.

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Abstract. The maintenance of semi-natural grasslands within the mountainous landscape is deeply influenced by fertilization. Application of fertilizer will cause changes in the chemical composition of the plant and will increase the palatability, decreasing the denials. One should apply fertilizers taking into account the way of exploitation of the grassland. If the grasslands are grazed, much of the nutrients return into the meadow by manure, fattening being more important than on mowed lawns where all the nutrients taken from plants are exported. The aim of this paper was to assess the influence of organic and mineral fertilizers upon semi-natural grassland’s plant diversity on different soil types. The research was carried out in Apuseni Mountains, in an experimental field with one experience with organic fertilizers (T1 control, T2 10 t ha⁻¹ manure, T3 20 t ha⁻¹ manure, T4 30 t ha⁻¹ manure). Mineral fertilizers complex NPK 20:10:10 ratio was applied in three quantities: 50N 25P 25K, 100N 50P 50K, and 150N 75P 75K. The results showed that the largest quantities of mineral fertilizers generated a considerable decrease of plant diversity. For future management actions that are meant to maintain plant diversity in Apuseni Mountains, the organic fertilization with 10 t ha⁻¹ manure quantities administrated annually or once on two years. In conclusion is justified to make organic treatments on Preluvosol Rodic soil type and mineral treatments on Eutricambosol Rendzinic soil type.

Keywords: mountainous grassland, organic fertilization, mineral fertilization, plant diversity, type of soil.

INTRODUCTION

The maintenance of semi-natural grasslands within the mountainous landscape depends greatly on fertilization. Application of fertilizer will cause changes in the chemical composition of the plant and will increase the palatability, decreasing the denials. Manure is a complete fertilizer used mainly in mountain areas with heavy rainfall, where has an increased efficiency on the growth of green mass yield, leading, on one side, to an increase in the percent of participation of leguminous plants in the vegetal cover and on the other hand on the soil enrich in elements like P₂O₅, K₂O, CaO, MgO (GUEYDON, PERROLAZ, Drieu, 1994). One should apply fertilizers taking into account the way of exploitation of the grassland. If the grasslands are grazed, much of the nutrients return into the meadow by manure, fattening being more important than on mowed lawns where all the nutrients taken from plants are exported (Rotar and Carlier, 2010).

MATERIALS AND METHODS

The experimental field is located in the Ghetari, Gârda de Sus village, Alba County, Apuseni Mountains at 1130 m elevation and started in 2001, using the random blocks method with 4 variants in 5 replications. The organic experiment fields included 4 treatments in 4
repetitions (T₁ control, T₂ 10 t/ha manure, T₃ 20 t/ha⁻¹ manure, T₄ 30 t/ha manure). Each plot measures 10 m². The technological inputs administration took place annually in early spring. The organic fertilizer is of cattle and horses origin, having the following elements content: 0.40N, 0.39P and 0.45K. The experimental field was placed on Terra Rossa soil having the following characteristics: 5.34 soil pH, 0.212 % total N, 3 ppm mobile P, 25 ppm K. Thus, a medium supply in N and extremely low in P and K are noticed. The mineral field is similar and includes 4 treatments in 4 repetitions (T₁-treatment, T₂-50N 25P 25K, T₃-100N 50P 50K, T₄- 150N 75P 75K). The floristic studies were performed according to Braun-Blanquet method. The paper aims to analyse the influence of both types of treatments on the grass cover situated on two different types of soil: eutricambosol rendzinic and preluvosol rodic.

RESULTS AND DISCUSSIONS

The results registered on mineral fertilization, in the year 2010 showed a more powerful installation of Poaceae sp. in detriment of other economic groups for both phytocenosis.

In 2011, on Preluvosol Rodic soil type subjected to mineral fertilization Poaceae sp. increased their percentage of participation under the influence of treatment up to 70.31% in T₃ treatment, while the organic fertilizer maintained the same type of lawn at 10t/ha manure treatment and determined the installation Trisetum flavescens-Agrostis capilaris type on treatment with 20t/ha and 30t/ha manure. The intensification of the crop system caused a reduction in Poaceae sp. percent of participation, such that on Preluvosol Rodic soil type they decrease from 51.31 % on unfertilized variant to 34.56% on the variant fertilized with 30t/ha manure) while on Eutricambosol Rendzinic soil type Poaceae sp. increased slightly in variant with 10 and 20t/ha manure and drops to 38.78% on the variant with 30t/ha manure.

In drought years (2011) the phytocoenosis from Eutricambosol Rendzinic soil type responded better to organic input and performs the DM harvest levels higher than those fertilized with manure on Preluvosol Rodic soil type. The treatment with manure in 2011 on Preluvosol Rodic soil type lead to a reduction in the percentage of Poaceae sp. from 48.44% (on control variant) up to 31.31% for the variant fertilized with 30 t/ha manure. In phytocoenosis from Eutricambosol rendzinic soil type the treatment with manure had repercussions on the grass cover. By applying this treatment Poaceae sp. modified its coverage percent in comparison to control variant, but their development didn’t had statistical assurance.

CONCLUSION

Phytocoenosis response on organic inputs depends on the climatic conditions specific to one year and on the physic-chemical properties of the soil.

The use of mineral fertilizers on Preluvosol Rodic soil type is very different from one year to another, depending on weather conditions.

On drought years fertilizers application in 150N 50P₂O₅ 50 K₂O is not justified on Preluvosol Rodic, because it results in very low yield and extra inputs.

The behavior of phytocoenosis from both types of soil, on organic and mineral fertilizers, is similar in identical climatic conditions, such that in drought years phytocoenosis from Preluvosol Rodic soil type reacted both on organic and mineral fertilization having different behavior that the one from Eutricambosol Rendzinic.
In conclusion we can state that is justified to apply organic treatments on Preluvosol Rodic soil type and mineral treatments on Eutricambosol Rendzinic soil type.

REFERENCES

