FORAGE PRODUCTIVITY AND SOIL FERTILITY UNDER ORGANIC FERTILIZER CONDITIONS ON *Agrostis capillaries* PASTURES

PRODUCTIVITATEA FURAJULUI ȘI FERTILITATEA SOLULUI PE O PAJIȘTE DE *Agrostis capillaries* L. ÎN CONDITII DE FERTILIZARE ORGANICĂ

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In the last time was applied a deficient management on the grassland, from Romania. This aspect has affected the yield and forages quality on the grassland. Different measures of grassland improvement were studied, for to do away with these negative effects. The researches were carried out of 2006-2008, at Grassland Research Institute Brasov, on districambosol tipic soil, pH\textsubscript{H2O} 5.6, with a low content of mineral nutrients. An organic system of fertilisation was studied on a *Agrostis capillaris* and *Festuca rubra* tipe of grassland. 20, 40, 60 t.ha\textsuperscript{-1} manure levels where applied in different period (autumn, spring). The effect of organic fertiliser level, the time of organic fertiliser apply and methods of grassland using (hay or frequent cutting) on botanical composition, DM yield and soil fertility were studied. The organic fertilization has causes an economical pastures using, 70-135 % DM increasing, with a stable productivity, increase the fertility and vegetal cover density and the landscape improvement. The proportion between species was changes, due to the more cutting and fertilization. To maintain a landscape and a high biodiversity is necessary only one cutting.

**Keywords:** grassland, botanical composition, manure, DM yield, soil fertility.

Introduction

A deficient management was apply on a large surface of grasslands from Romania in the last ten years and has as the results a reducing economical. The productivity of grasslands is frequently limited and has been associated with unstable herbage yield. It is changes botanical composition and is reducing forage quality. The unavailable species herbaceous and woods increase their participation in vegetal cover, while the grasses and legumes have reduced their participation. Also a large surface was abandoned and landscape was deteriorated, too (Rotar I. et al. 2006, Vintu V. et al 2006).

The semi-natural grasslands of *Agrostis capillaris* cover over 20 % from total surface of Romanian grasslands (Razec I et al 1996) on boreal level, with biggest
possibilities for herbivores breeding. Their high capacity of resilience made possible to keep in the good limits of yield with minimum of inputs. The fertilizer, using regime and ecological factors have a big influence on productivity and botanical composition (Frame 2000). The objective of this study was to evaluate the effects of organic fertilizer and different cutting regimes on dry matter yield, botanical composition and soil fertility on the Agrostis capillaris degraded grassland.

Material and Methods

The experiment was carried out in Brasov area, the central part of Romania, during three years (2006-2008). Experimental field (640 m altitude, 750 mm average annual precipitation, 7, 2 °C mean annual temperature), on semi-natural grassland association Agrostietum capillaries - Festuca rubra (75 – 80 % cover), on a disticambosoil tipic soil (pH H2O –5, 6) moderate content in phosphor (P_AL 67 ppm) and potash (K_AL 78 ppm). Three levels of manure (solid cattle manure) 20, 40, and 60 t.ha⁻¹ equivalent 60-120-180 kg. ha⁻¹ N; 21-42-63 kg. ha⁻¹ P and 29-58-87 kg. ha⁻¹ K, were applied in the autumn (November - AA) and in the spring (March-SA). A randomized block design was used with three replicates. Each plot was split for two cutting regimes, frequently (15-18 cm high, grazing regime) and for hay, resulting 12 plots and control plot for each replication. Total dry matter (DM) yield, botanical composition and proportion for each species were determined for the first cut. The soil chemical composition was determined by standard methods.

Results and Discussion

Between years of study, there was a difference DM yield due to climatically conditions and the organic fertiliser. Total DM yield obtained for each year 2006-2008, under influence of different levels of cattle manure fertilizer, is presents in Figure 1. The manure effect is insignificant in the first year of harvest for 20 and 40 t. ha⁻¹ level. Their influence has increased for second and third year of harvest. Between cutting regimes there are significant differences of DM yield. The yields obtained are the highest for all plots, when the pastured is using as hay. Between the times of manure apply, autumn or spring, isn’t significant differences of DM yield. The manure fertilization has affected annual proportion of grasses and legumes species and other species in total DM yield. The evaluation botanical composition (Figure 2) shows a bigger participation of grasses to use as meadow and the legumes by frequent cutting. Similarly, Gaisler et al (2006) has recommended an increase legumes species under frequently mulched treatments.
Figure 1. DM yield for each year depending of manure fertilizer level and time of application.
The other species group has a higher participation by using a 60 t.ha\(^{-1}\) level of manure. Some species such as *Poa pratensis*, *Dactylis glomerata*, *Festuca pratensis*, *Trifolium pratense* and *Trifolium repens* improvement their participation with 5-10 % in detriment of dominant species as: *Agrostis capillaris*, *Anthoxanthum*, *Cynosurus cristatus*, and others species. Also the density of vegetative cover has increased too.

The main nutritional macro-elements of soil (P and K) were influenced under manure treatments (table 1)

![Graph showing proportion of participation in different methods of using manure.]

Figure 2. The influence of organic fertilizer on botanical composition in different methods of using
Table 1: The influence of organic fertilizer (AA-autumn, SA-spring apply) on soil fertility

<table>
<thead>
<tr>
<th>Manure treatment</th>
<th>Frequent cutting</th>
<th>Hay</th>
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<tbody>
<tr>
<td></td>
<td>pH</td>
<td>H</td>
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<tr>
<td>H₂O % ppm</td>
<td>H₂O % ppm</td>
<td>H₂O % ppm</td>
</tr>
<tr>
<td>20 t.ha⁻¹ AA</td>
<td>5.6</td>
<td>5.2</td>
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<tr>
<td>20 t.ha⁻¹ SA</td>
<td>5.6</td>
<td>5.3</td>
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<tr>
<td>40 t.ha⁻¹ AA</td>
<td>5.7</td>
<td>5.3</td>
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<tr>
<td>40 t.ha⁻¹ SA</td>
<td>5.6</td>
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<tr>
<td>60 t.ha⁻¹ AA</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>60 t.ha⁻¹ SA</td>
<td>5.8</td>
<td>5.4</td>
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<tr>
<td>Unfertilized</td>
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Conclusions

The results of the present study confirm that, for pastures restoration and conservation, is necessary a long period and with permanent minimal technological imputes.

The organic fertilization has causes an economical pastures using, 70-135 % DM increasing, with a stable productivity, increase the fertility and vegetal cover density and the landscape improvement.

The proportion between species was changes, due to the more cutting and fertilization. To maintain a landscape and a high biodiversity is necessary only one cutting.

References