Effect of native grassland intensification over cattle performance

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INTRODUCTION

The objective was to evaluate the effect of different levels of intensification in native grassland on cattle live weight gain (LWG), stocking rate (SR) and average daily gain (ADG) in western Uruguay Campos.

METHODS

The study was carried out in 7.8 ha in Paysandú, between winter 2015 and autumn 2019. Experiment was a randomized complete block design, with 4 replicates. The four treatments applied were native grassland (NG), NG overseeded with Trifolium pratense (6 kg.ha-1) and Lotus tenuis (6 kg.ha-1) + 40 kg.ha-1 of P2O5 (NGO), NG fertilized with 60 kg.ha-1 of N + 40 kg.ha-1 of P2O5 (N60) and NG fertilized with 120 kg.ha-1 of N + 40 kg.ha-1 of P2O5 (N120). Fertilizers used were urea and a blend of 7-40/40-0-4. Animals were growing Holstein steers, with initial live weight of 180 ± 22 kg. Treatments management consisted of rotational stocking system, subdivided in 4 plots, according to blocks. Grazing periods were 14 ±1 day, and rest periods were 45 ±2 days, totaling a grazing cycle of 60 days. The average area of the plots of NG and NGO treatments was 0.72 ha while the treatments of N60 and N120 was 0.26 ha.

RESULTS

The annual real herbage allowance between treatments was between 8 and 12 kg DM. kg LW-1. These management allowed that the residual average pasture height was at least 7 cm. We observed an effect of the native grassland intensification over SR (marginally) and LWG per area but not over animal daily gain. Increasing levels of intensification in native grassland allowed marginally higher SR. The higher SR was in fertilizer treatments, intermediate in overseeded native grassland and the lowest in control grassland, associated with associated with higher growth rate and same herbage allowance in the latter than the former treatments.

Conversely, we did not observe and effect of the native grassland intensification over the animal daily gain. The ADG was not different between treatments (P = 0.372), averaging 0.472 kg LW.animal-1.day-1 in all treatments. Finally, we observed an effect of the intensification over the live weight gain per area (P = 0.050). The LWG was higher in N60 (432 ±107 kg LW.ha-1.year-1), intermediate in N120 (391 ±91 kg LW.ha-1.year-1) and NGO (306 ±148 kg LW.ha-1.year-1) and lower in NG (206 ±63 kg LW.ha-1.year-1).

CONCLUSIONS

We found that managing native grassland under optimal herbage allowance and zero costs, we could triple the LWG per area in relation than traditional management. If we overseed with legumes and fertilized with nitrogen and phosphorus we can obtain higher LWG per area, as a result of an increase in SR, and animal performance. Finally, we observed an effect of nitrogen fertilization up to 60 units per area per year. Considering economical, and basically ecological sustainability, the use of 120 units of nitrogen per area per area, does not seem to be recommended in this conditions.

SUMMARY:

- Increasing levels of intensification in native grassland allow higher SR, determining higher LWG.
- Grazing pasture systems under non-limiting pasture quantity and nutritive value with intermediate herbage allowance (8 to 12%) it is possible to triple the annual LWG per area in Campos regions in relation to traditional management.
- The use of 120 units of N did not have response in animal performance. Considering the economical and ecological sustainability, its use is not recommended in our conditions.

Table 1 Mean treatment effect (NG: native grassland, NGO: overseeded native grassland, N60 and N120: fertilized native grassland with 60 and 120 kg.ha-1 of N, respectively) and standard error (SE) on stocking rate (SR), average daily gain (ADG) and live weight gain (LWG)

<table>
<thead>
<tr>
<th></th>
<th>NG</th>
<th>NGO</th>
<th>N60</th>
<th>N120</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR (kg LW.ha-1)</td>
<td>544</td>
<td>583</td>
<td>868</td>
<td>856</td>
<td>98</td>
<td>0.066</td>
</tr>
<tr>
<td>ADG (kg LW.animal-1.day-1)</td>
<td>0.37</td>
<td>0.52</td>
<td>0.52</td>
<td>0.47</td>
<td>0.06</td>
<td>0.372</td>
</tr>
<tr>
<td>LWG (kg LW.ha-1.year-1)</td>
<td>206a</td>
<td>306ab</td>
<td>432b</td>
<td>391ab</td>
<td>54</td>
<td>0.050</td>
</tr>
</tbody>
</table>

Different letters following means in rows indicate statistical significance at P < 0.05.