Managing seasonality in grassland quality and quantity

Forage biomass and bovine live weight changes within monospecific and mixed prairies over the dry season in tropical México

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Introduction

In the tropical systems of cattle grazing, the limited period of forage production and low forage protein content and digestibility of the same, are the main constraints to increasing live weight gain. Grass-legume pasture improves forage quantity and quality and sowing mixed swards in both the wet and dry tropics is now common practice. However, much less is known if inclusion of a fodder tree as a third component could further improve forage parameters. The aim of this study was to evaluate three types of grasslands, grazed by cattle in the dry season of the dry tropics. Swards were established to compare: grass only (PP), grass-legume (PA) and silvo-pastoral (PSP) pastures on basis of forage on-offer, residual and disappeared and bullock’s daily live-weight gain. Species used were: Andropogon gayanus Kunth, Clitoria ternatea Linn and Morus alba Linn.

Material and methods

The study was conducted at the Experimental Station INIFAP, Iguala, Mexico (18° 22' N, 99° 33' W). The experimental area was an area of 3.0 hectares, with blocks of 1.0 ha, which comprised: (PP) Andropogon gayanus, (PA) A. gayanus and Clitoria ternatea and (PSP) A. gayanus, C. ternatea and Morus alba, in a completely randomized block design with three replications. Herbage mass included grass, legume and tree components. There were two rotational grazing cycles with 8 days of occupation and 56 days of rest, with a total of 126 days experimental period. To evaluate the dynamics of the pasture a four-meter transect was used; on one side forage offered was measured and on the other residual forage was evaluated. Prairies were grazed by steers, with a prior period of adaptation to the experimental site of 15 to 21 days. One steer grazed each experimental unit. To determine the weight, the animals were weighed at baseline and again at the end of each grazing cycle, at the same time without being fasted. To compare the effect of treatments, data were statistically analyzed with the GML procedure of SAS.

Results

Forage on offer and residual forage were different \((P <0.05)\) among prairies (Fig. 1). The forage offered for grazing was 1445, 3477 and 2595 kg of dry matter/ha for the PP, PA and PSP, respectively. In residual forage there was a difference between PP and PA, while PSP was

![Figure 1. Morphologic components of present forage on pure and associated prairies during dry season](image-url)
Table 1. Live weight gain of cattle grazing pure and associated (mixed sward) prairies during dry season.

<table>
<thead>
<tr>
<th>Prairies</th>
<th>Liveweight Gain</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ani/day</td>
<td>ani/period</td>
<td>ha/day</td>
<td>ha/period</td>
</tr>
<tr>
<td>PP = A. gayanus</td>
<td>0.305 b</td>
<td>38.5 b</td>
<td>0.917 b</td>
<td>115.5 b</td>
</tr>
<tr>
<td>PA = A. g. + Clitoria ternate</td>
<td>0.663 a</td>
<td>83.5 a</td>
<td>1.998 a</td>
<td>250.5 a</td>
</tr>
<tr>
<td>PSP = A. g. + C. t. + Morus alba</td>
<td>0.611 a</td>
<td>77.0 a</td>
<td>1.833 a</td>
<td>231.0 a</td>
</tr>
<tr>
<td>Pr F</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
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<tr>
<td>Variation coefficient</td>
<td>11.9</td>
<td>11.9</td>
<td>11.9</td>
<td>11.9</td>
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intermediate. The forage disappeared was similar among prairies ($P \geq 0.05$). Changes in forage present, are mainly due to changes in the amount of stems and forage dead material. The weight gain per animal per day was 0.305, 0.663 and 0.611 kg and weight gain per hectare per day of 0.917, 1.998 and 1.833 for PP, PA and PSP, respectively (Table 1).

Conclusions

As a result of greater forage and live material amounts in associated, mixed sward prairies, grazing cattle had superior live weight gain. Mixed prairies with grass, legume and fodder trees are good options for farmers in the tropics.

References