Introduction

In recent years greenhouse gas emissions from ruminant production have been considered to have a significant impact on the atmosphere's gas composition. Some may claim that the global number of ruminants should be reduced to mitigate the impact of animal production on climate change and consequently generating important social and environmental co-benefits [1]. However, the world's population will reach 9.1 billion and the question is: How will we feed the world's population at that time? [2]. The challenge is not only to produce more, but it is also necessary to produce food safely, with healthy animals, taking care of the environment and with high animal welfare standards, hence a sustainable animal production industry. Many countries in the world base their national economies on beef cattle production, but recent increases in land prices, accelerated development of agriculture, and the need to increase the productivity per hectare have made new mixed production models to become more common, such as silvopastoral systems which integrate forestry plantations with extensive beef production. In tropical regions, especially in Latin America, these systems have proved to be beneficial for cattle production by providing protection from extreme weather and a richer environment, hence improving animal welfare. Animals in these systems benefit from; lower skin temperature (1.79oC lower than without shade access), and use of less water and energy to maintain body temperature [3].

From the behavioural point of view, high temperatures reduce grazing times in non-shaded extensive systems, while this does not happen in silvopastoral systems [4]. Also animals show less fear in SPS because they can hide in the trees when they feel threatened [5]. Consequently, there is better human-animal interaction making the handling easier [6]. Many authors found that animals had better nutrition and growth in SPS. In some regions, the presence of nitrogen-fixing shrubs improves animal nutrition, water retention of the soil and protection against droughts. Likewise, SPS accumulate more carbon in biomass, having, hence, a good capacity to mitigate climate change [7]. Aiming to characterize silvopastoral systems in temperate climate, we evaluated some environmental conditions comparing those with traditional natural grassland beef production in the south of Uruguay, a Latin American country.

Methods

During 2015-2016 a herd of 24 cows Bos taurus taurus (Hereford breed), 24 months old, average weight of 365±41.2kg, were...
Results and Discussion

Preliminary results showed that during the summer time, temperatures and humidity index (THI) was higher in SPS than in NG, in some cases reaching alert levels, however no heat stress behaviour was observed in the animals, while in winter there were no differences, neither THI nor in animal behaviour. The animals in SPS dedicated more time grazing in summer than the animals in NG systems. The reduction of sun radiation in the SPS could account for this. Considering that in SPS the effective grazing surface is smaller than NG due to the presence of the trees, yet no significant differences were found in animal performance in both groups; however animals in SPS showed less dispersion in body weight during the study period. The botanical species diversity index was higher in SPS in comparison with NG (1.69 vs. 1.55 respectively), but in both systems botanical species of agronomic interest and of a great adaptability were presented and quantified.

Due to several aspects such as: the generation of microclimate conditions, higher quality pastures, protection against solar radiation and strong winds for animals, mainly due to the forest component the SPS appear to be non-inferior in productivity and animal welfare to the natural grassland based beef production. In addition, silvopastoral systems allow; greater stability in weather conditions, higher quality pastures, protection against solar radiation and strong winds for animals, mainly due to the forest component the SPS appear to be non-inferior in productivity and animal welfare to the natural grassland based beef production. The reduction of sun radiation in the SPS could account for this. Considering that in SPS the effective grazing surface is smaller than NG due to the presence of the trees, yet no significant differences were found in animal performance in both groups; however animals in SPS showed less dispersion in body weight during the study period. The botanical species diversity index was higher in SPS in comparison with NG (1.69 vs. 1.55 respectively), but in both systems botanical species of agronomic interest and of a great adaptability were presented and quantified.

Conclusion

SPS show promising results for beef production in temperate weather conditions. It is necessary to continue with this line of research, in temperate climates and with European breeds like the present study, since the results so far are extremely auspicious.

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References