

dairy and 6 Farmers Meeting with over 200 small family farmers. The projects at the Associação dos Agricultores da Encosta da Serra Geral - AGRECO at Santa Rosa de Lima are certified by ECOCERT DO BRASIL, producing organic dairy products for schools' organic lunches.

Conclusions

This program has provided undergraduate students, family farmers and communities with the opportunity to design and build, not only a new pasture-based milk production system for the different regions, but also a rural development model based on consolidated experiences. The GPVoisin – Pasture Outreach Program has helped to increase farm profitability through pasture based dairy (Rizzoli and Schmitt, 2007). Farmer quality of life has improved and rural migration has been reduced in these rural communities.

References

- Murphy W 1998. Greener Pasture on Our Side of the Fence: Better Farming with Voisin Grazing Management. Arriba Publishing, Vermont USA.
- Saade J. P. (2003) Grupo de Pastoreio Voisin: Metodologia de Implantação, Trabalho de Conclusão de Curso – Curso de Agronomia, UFSC Brazil.
- Rizzoli A and Schmitt A 2007. Farmer's perception about the transition from conventional to pasture based agroecologic dairy. Brazilian Meeting in Systems Thinking, 25–26.

doi:10.1017/S2040470010001330

Mixed grazing systems to improve production gains at pasture: a review

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Introduction

The frequent use of anthelmintics to limit gastro-intestinal nematodes has led to the emergence of resistance to these drugs (Jackson and Coop, 2000). Mixed grazing is an alternative system which can be used to reduce parasitism and increase meat production at pasture. Mixed grazing is common but few studies have quantified the benefits. Difficulties exist in comparing different experiments on mixed grazing. This review will try to quantify the benefits of this strategy.

Materials and Methods

Papers found on mixed grazing were selected when they had enough precise data with the same stocking rate to compare mixed and control treatments. Twelve were used to construct a database comprising 244 lines (each one considered as a statistical unit) corresponding to various papers with several treatments.

To analyse the different papers and appraise the benefits of mixed grazing, we considered 2 criteria: the average daily gain (ADG) and the global production (GPobs). The GPobs observed in mixed treatment (M) was calculated as global production and expressed as g/d/ha: $GP_{obs}/ha = [(nb_{Sheep_M} * ADG_{Sheep_M}) + (nb_{Cattle_M} * ADG_{Cattle_M})]/Surface$; This GPobs was compared to theoretical production (GPtheo) calculated as production from the same number of sheep and cattle and same surface than in M but with the same ADG than in control conditions. $GP_{theo}/ha = [(nb_{Sheep_M} * ADG_{Sheep_C}) + (nb_{Cattle_M} * ADG_{Cattle_C})]/Surface$. Stocking rate and ratio were also considered to analyse the benefit of mixed grazing. In order to compare mixed grazing situations, the stocking rate was calculated by multiplying the initial bodyweight (kg) with the number of animals per hectare and the ratio was calculated as the proportion of the weight of cattle on the total weight (cattle plus sheep) in the association, varying from 0 (sheep control) to 100 (cattle control).

Results

Mixed grazing was significant on ADG of sheep ($P = 0.001174$). The relation between the ADG and the ratio was: $ADG_{Sheep} = 147 + 0.395 * ratio (Cattle/Cattle + Sheep)$ ($SE = 0.118$). For a ratio of 50% of cattle, the gain represented 167 g/d that is to say a gain of 14% compared to the control (147 g/d). There was also an effect of mixed grazing on GPobs ($P = 0.0087$) and the equation is: $GP_{obs_M} = 1579 + 55.5 * ratio (Cattle/Cattle + Sheep) - 0.385 * (ratio (Cattle/Cattle + Sheep))^2$.

For the GPtheo the relation is: $GP_{theo_M} = 1478 + 16.5 * ratio (Cattle/Cattle + Sheep)$. The gain of mixed grazing is significant with a GPobs greater by 47% compared to the GPtheo with a ratio of 50%.

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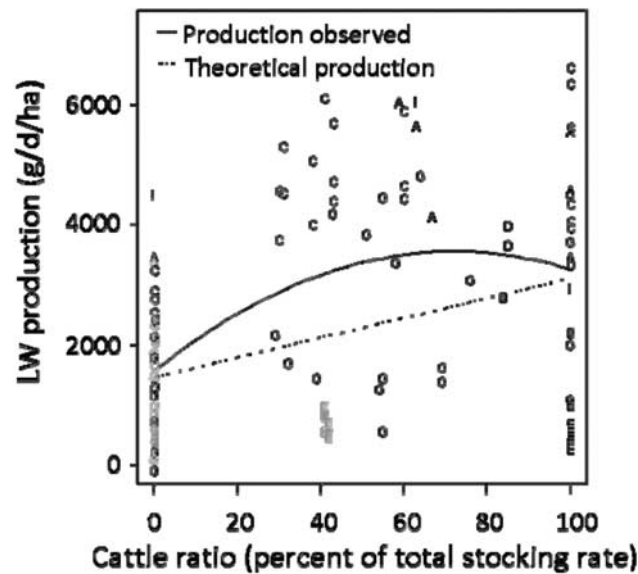


Figure 1 Observed or theoretical Production (g LW/d/ha) according to the ratio of cattle

Discussion

This analysis allows quantification of the effects of mixed grazing on individual or global production. Considering the two criteria of ADG and GPobs, mixed grazing allows real gains which are more significant for sheep than for cattle. For goats, data were too limited to be analysed in our database and the association was more appropriate for sheep than with cattle. The GPobs gives a better idea of benefits and level of production per unit area which will be better understood by farmers than just using individual gain which is less important than the GPobs gain. The profit for mixed grazing is determined by the ratio which has a significant effect in our database for 50% of live weight of cattle in the association. The link between ratio and stocking rate was shown in some studies but for our analysis there did not involve enough experiments with different stocking rate for the same ratio to show the effect of stocking rate. The benefits of mixed grazing are mostly explained by two main factors which are the dilution of parasites and the complementary feeding strategy. But no studies have yet tried to estimate importance of each factor thus explaining the production gain. Most studies are undertaken to analyse each factor separately rather than analysing them together. A current study is in hand on mixed grazing between goats and heifers to quantify the gain and identify the nutrition and parasitism part of this benefit.

Acknowledgement

The authors want to thank Frank Jackson for his help and suggestions. This work has been partly supported by the European Union (FSE) and Region Guadeloupe.

Reference

Jackson F and Coop RL 2000. *Parasitology* 120, S95–S107.