Study of carcass characteristics of Creole cattle steers raised in two contrasted post weaning systems

Aurélie Agastin, Alain Farant, Bruno Bocage, Xavier Godard, Michel Naves

opinion-based study to validate previous results and initiate collective reflections.Secondly, several experimental studies (Figure 1) will be implemented in different conditions (on farm and on-station) and scales (both temporal and spatial) representative of the different identified and promising MFS types. This has the objective of evaluating their efficiency in term of agro-ecological and socio-economical outcomes, and develop the methodology to optimise these promising integrative systems relevant to particular Guadeloupean farms conditions.

Finally, communication on the different outcomes of this project will be at different levels: to farmers and agricultural technical advisors by producing technical reports and guidelines; to educational staff and students by creating lecture notes and educational tools, and; to the scientific community by publishing results in scientific journals.

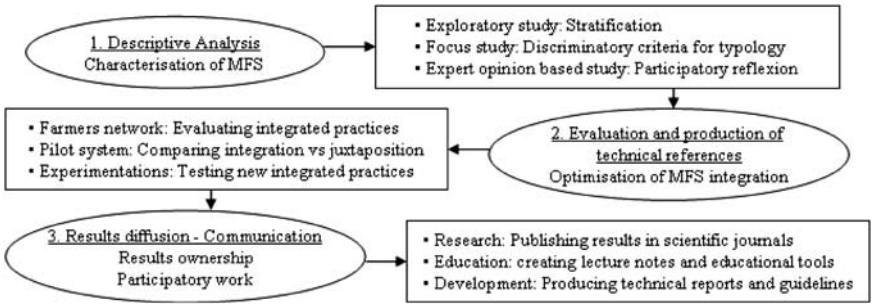

Figure 1 RED project methodology

Perspective

This participatory methodology should be an example which demonstrates that sustainable agricultural development can be reached if relationships between different local partners of RED are involved. It should be stressed that communicating outcomes is essential in order to develop ownership of the results and further focus all stakeholders on the same goals.

Acknowledgements

The reseachers are grateful to everybody that is and will be involved in this study either by agreeing to be interviewed, by their expertise, and by their financial support. This study is funded by the FEADER, the Centre INRA Antilles Guyane, the EPLEFPA and the Chambre d'Agriculture of Guadeloupe.

References

Stark F, Alexandre R, Diman C, Fanchone A, Alexandre G and Diman JL 2010. Intégration au sein des systèmes de type polyculture élevage en Guadeloupe : première caractérisation. 3R La Vilette, Paris, Decembre 2010 (In press).

Thornton PK and Herrero M 2001. Integrated crop–livestock simulation models for scenario analysis and impact assessment. Agricultural Systems 70, 581–602.

doi:10.1017/S204047001000124X

Study of carcass characteristics of Creole cattle steers raised in two contrasting post weaning systems

Aurélie Agastin[1], Alain Farant[2], Bruno Bocage[3], Xavier Godard[2] and Michel Naves[1†]

[1]INRA, UR143, Unité de Recherches Zootechniques, 97170 Petit Bourg, Guadeloupe (FWI); [2]INRA, UE1294, Plateforme Tropicale d'Experimentation sur l'Animal, 97160 Le Moule, Guadeloupe (FWI); [3]INRA, UE1294, Plateforme Tropicale d'Experimentation sur l'Animal, 97170 Petit Bourg, Guadeloupe (FWI)

Introduction

Urbanization, rising per capita incomes and economic growth has encouraged higher consumption of meat in developing countries. As a consequence, livestock production must be more productive. The productivity of livestock systems depends on many factors, which we should

† E-mail: michel.naves@antilles.inra.fr

identify in order to help farmers over technical choices. At the same time, environmental concerns and socio economic acceptability may interfere with technical options. In this study, our purpose was to compare two contrasting post weaning management systems, on animal production results. This study contributes to a holistic evaluation of these management systems for beef production in the tropics.

Material and methods

Between 1999 and 2009, 269 young steers were allocated to two different production systems: "stalls" ($n = 157$), where animals were maintained indoors and fed with cut grass and concentrate (maize: 68%; wheat middling: 22%; soya meal: 8%; net energy: 7.46 MJ/kg DM; crude protein: 148.5 g/kg DM), distributed up to 60% of their voluntary intake, and "pasture" ($n = 112$), where animals were fed outdoors at pasture, with only grazed tropical forages. During the experiment, the animals were regularly weighed every 2 weeks. Slaughter ages were defined in order to obtain equivalent live weight ranges at the end of the fattening period: 14–17 months for penned steers, and 17–21 months for grazing steers. Immediaately on arrival at the slaughter house the steers were fasted for 24 hours and then weighted just before slaughter. The different organs and the carcass components were weighted and the dressing percentage calculated. Linear measurements on the carcass were also made after 24 hours of chilling and the tissue composition of the 11th and 6th ribs determined by dissection. Furthermore, body measurements just after weaning and at the end of the growing period helped to identify morphological changes of the steers. The statistical interpretation of the different traits was performed by the GLM procedure of SAS (1999). Differences of morphological development between the two production systems were studied with the CORR procedure. Significant results are presented here.

Results

Animals on the "stall" treatment had an average daily gain (ADG) 231 g/day higher than on the "pasture" treatment. Due to the differences in slaughter age, the slaughter live weight was on average 345 kg for the penned animals and 334 kg for the grazing animals. The total liveweight gain was 164 kg $+/-$ 44 kg, without differences between treatments. The ADG observed is in agreement with previous results on Creole cattle (Naves, 2003). The weight at the end of the growing period was close to those of Romosinuano, Brahman and Senepol (Chase *et al.*, 1997) and Nellore (Nobre *et al.*, 2003) with breeds reared in similar conditions. Steers on the "stall" treatment had better cold carcass weight and better dressing percentage. But they had higher fat deposits and less muscle and bone percentage than on the "pasture" treatment. Differences observed between "stalls" and "pasture" treatments are the consequence of both the feeding regime and housing conditions: on "pasture", the steers consumed less energy, moved more than animals in "stalls", and had to regulate their internal body temperature according to the outside temperature, which consumes energy for grazing animals. The dressing and muscle percentages are lower than those reported for European beef breeds (Alberti *et al.*, 2008), but closer to those of local Spanish breeds (Alberti *et al.*, 2008) and of African breeds (Strydom *et al.*, 2001) at the same age.

Table 1 *Main beef characteristics of Creole steers reared either in intensive fattening ("stalls") or grazing ("pasture")*

Trait (least squares means for management system)	Stalls	Pasture	RMSE	Threshold
Average daily gain (fattening period) (g/day)	725	494	108	$P < 0.001$
Cold carcass weight (kg)	178	166	20	$P < 0.001$
Dressing percentage	55	53	1.6	$P < 0.01$
Carcass muscle percentage	70	71	2.2	$P < 0.01$
Carcass bone percentage	13	14	0.8	$P < 0.05$
Carcass fat percentage	16	14	2.3	$P < 0.05$

Conclusion

Penned animals grew faster and had higher dressing percentage, but they needed to be fed daily with cut grass and costly concentrates. Grazing animals produced a healthier meat, with more muscle and less fat, but they needed to stay longer on pasture to reach penned animal weights. Feeding strategy and management system are both involved in these differences. In order to improve the productivity of these systems, there is need to determine the specific effects of these two factors. A current study will help independently analyse each parameter, by offering the same feed (grass with or without concentrate) at "stall" and at "pasture", and separately studying the effects of the management system. This study will also allow a holistic analysis of these systems for beef production in the tropics, especially in their technical, economical and environmental implications.

References

Alberti P, Panea B, Sanudo *et al.* 2008. Live weight, body size and carcass characteristics of young bulls of fifteen European breeds. Livestock Science 114, 19–30.

Chase CC Jr, Hammond AC Olson TA *et al.* 1997. Introduction and evaluation of Romosinuano in the U.S.A. Razas bovinas creadas en Latinoamérica y el Caribe, 56–70.

Naves M 2003. Caractérisation et gestion d'une population bovine locale de la zone tropicale: le bovin créole de la Guadeloupe. Thèse de doctorat d'université. INA Paris Grignon, 283 p.

Nobre PRC, Misztal I, Tsuruta S *et al.* 2003. Analyses of growth curves of Nellore cattle by multiple-trait and random regression models. Journal of animal science 81, 918–926.

Strydom PE, Naude RT, Smith MF *et al.* 2001. Relationships between production and product traits in subpopulations of Bonsmara and Nguni cattle. South African Journal of Animal Science 31, 181–194.