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# Crossbreeding Creole cattle with European breeds in Guadeloupe: ambiguous results in the beef sector

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(Photo S. Barclay)



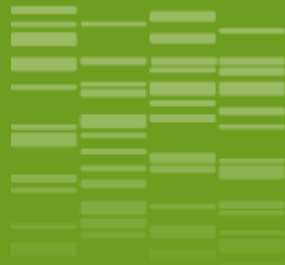
# INTRODUCTION

Development program of beef production in tropical countries is often based on crossbreeding with specialized cattle breeds.

Such crossbreeding have proved their efficiency on individual animal results (ADG, carcass conformation, meat production).

But their impact on production systems and the whole beef sector are more questionable.

The purpose of our communication is to review experimental results obtained on crossbreeding of Creole cattle with Limousin and statistical or economic data on cattle production systems in Guadeloupe



(Photo S. Barclay)

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# Material and methods

# Material and methods

## 1. Individual animal production results

**Experimental results in controlled conditions** (INRA Domaine de Gardel)  
(Berbigier *et al.*, 1986; Naves, 2003; Agastin *et al.*, 2013)

❖ **Suckling phase and weaning results with Creole cows:** (4 year exp.)  
Grazing cows herds, on improved irrigated pastures or natural dry savannas  
Stocking Rate = 1800 or 1200 kg/ha (+ forage supplementation if necessary)  
1<sup>st</sup> service AI with Limousin sires semen,  
followed by 9 weeks of natural mating with Creole sires  
Suckling during dry season, weaning at 210 d ; Tick control each 2 weeks

❖ **Growth and carcass characteristics at pasture or in intensive systems:**

- Pasture: irrigated Pangola grasslands (SR=1550 kg/ha),  
slaughtered between 17 and 21 months of age
- Intensive fattening: animal fed in stalls with fresh cut grass *ad libitum*  
and concentrate (2.5 to 4.5 kg, from 150 to 300 kg)  
slaughtered between 14 and 17 months of age



# Material and methods

## 2. Evaluation of economical results

### Simulations based on experimental results and observed economic data

- ❖ **Simulated models:** technical parameters obtained from previous experiments  
Comparison of productivity and income in stable F1 vs pure Creole herds
  - Production of weaned F1 calves
  - Meat production with F1 steers on improved irrigated pastures
- ❖ **Elasticity analysis:** changes of technical parameters in the simulation, in relation with known constraints revealed in surveys
  - **Fertility:** loss of fertility due to use of AI
  - **Mortality:** increased due to tick borne disease (cowdriosis,...)
  - **Growth:** decrease in ADG due to parasitism during suckling
  - **Combination of these changes**



# Material and methods

## 3. Impact on production systems and beef sector

### Surveys and statistical databases

#### ❖ Experimental surveys:

- Various studies performed since 1985 on beef cattle production systems: herd management, animal health, breeding strategies, alimentation, ... (Salas, 1989; Camus and Barré, 1990; Aliane, 1993; Boval, 1994; Naves, 2003)

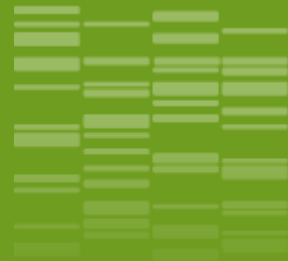
#### ❖ Public statistics databases:

- Official census and statistics on agricultural systems and beef production (Agreste, 2011; Institut de l'Élevage, 2011)

#### ❖ Review of various studies on economy of agriculture in Guadeloupe

- (Venkatapen, 1991; Diman et al., 2003; Delcombel, 2005; Institut de l'Élevage, 2008; Galan *et al.*, 2009)





(Photo S. Barclay)

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## Results and discussion



# 1. Individual animal production results (1/2)

## Growth performances

- ❖ **Suckling:** About 10 % higher growth performance for F1 vs. Creole calves

Breed	F1 Limousin x Creole		Creole	
	Male	Female	Male	Female
ADG (g/d)	705 <sup>a</sup>	667 <sup>b</sup>	653 <sup>b</sup>	578 <sup>c</sup>
Weaning weight (kg)	179 <sup>a</sup>	170 <sup>a</sup>	155 <sup>b</sup>	138 <sup>c</sup>

- ❖ **Post weaning growth**

About 15 % higher growth performances in F1 vs Creole, in either system  
In both breed, pasture growth allowed to achieve the same slaughter weight

Management	Intensive fattening		Pasture	
	Limousin	Creole	Limousin	Creole
ADG <sub>9-14 mo</sub> (g/d)	1040 <sup>a</sup>	882 <sup>a</sup>	647 <sup>b</sup>	534 <sup>c</sup>
Slaughter weight (kg)	360 <sup>a</sup>	310 <sup>b</sup>	358 <sup>a</sup>	322 <sup>b</sup>

# 1. Individual animal production results (2/2)

## Carcass characteristics of steers according to the management system

- ❖ Crossbred had better carcass quality (3 to 8 %) than Creole steers in terms of dressing percentage, conformation, muscle content
- ❖ Difference between breed lower at pasture (2 to 4 %) than in intensive growing
- ❖ Pasture management allowed better results in both breeds

Management	Intensive fattening		Pasture	
Breed	Limousin	Creole	Limousin	Creole
Dressing percentage	62.8 <sup>c</sup>	60.3 <sup>d</sup>	64.9 <sup>a</sup>	63.2 <sup>b</sup>
Hindquarter (%)	50.1 <sup>a</sup>	46.5 <sup>c</sup>	50.2 <sup>a</sup>	49.0 <sup>b</sup>
Carcass muscle (kg)	113.9 <sup>c</sup>	106.6 <sup>d</sup>	128.1 <sup>a</sup>	122.9 <sup>b</sup>
Carcas fat (kg)	25.7 <sup>c</sup>	26.6 <sup>d</sup>	17.3 <sup>a</sup>	17.2 <sup>b</sup>

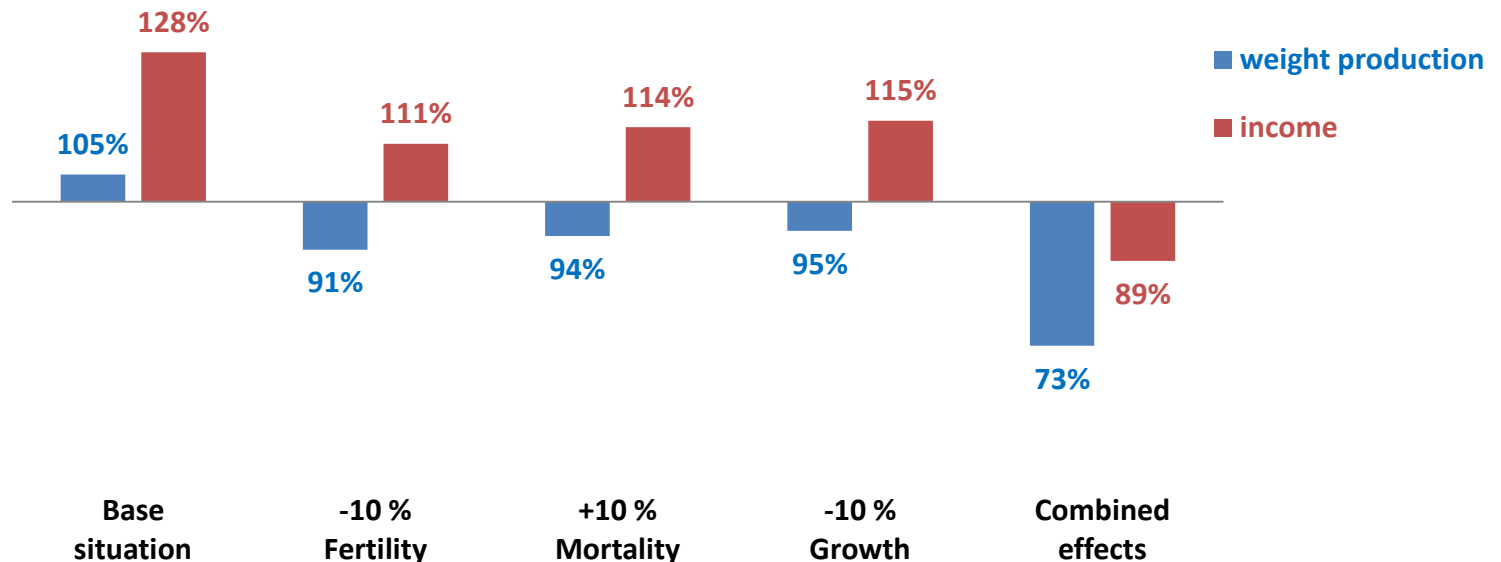


## 2. Evaluation of economical results (1/2)

(compared to pure Creole herd)

### Suckling phase

- ❖ Better overall productivity (+ 5 %),  
amplified by a better price paid (3.35 vs. 2.75 €/kg)
- ❖ Lower performances reduce the results by - 10 to - 14 pts (production)  
or - 13 to - 17 pts (income)
- ❖ Combined effects may reduce drastically the production and impair the incomes.

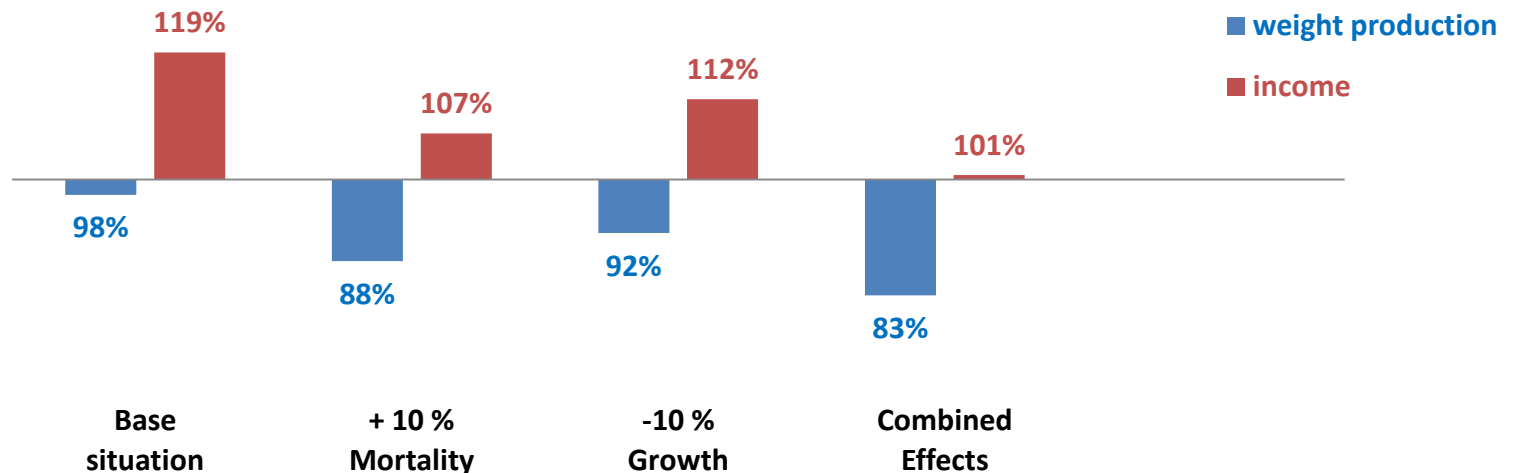


## 2. Evaluation of economical results (2/2)

(compared to pure Creole steers)

### Postweaning phase, at pasture

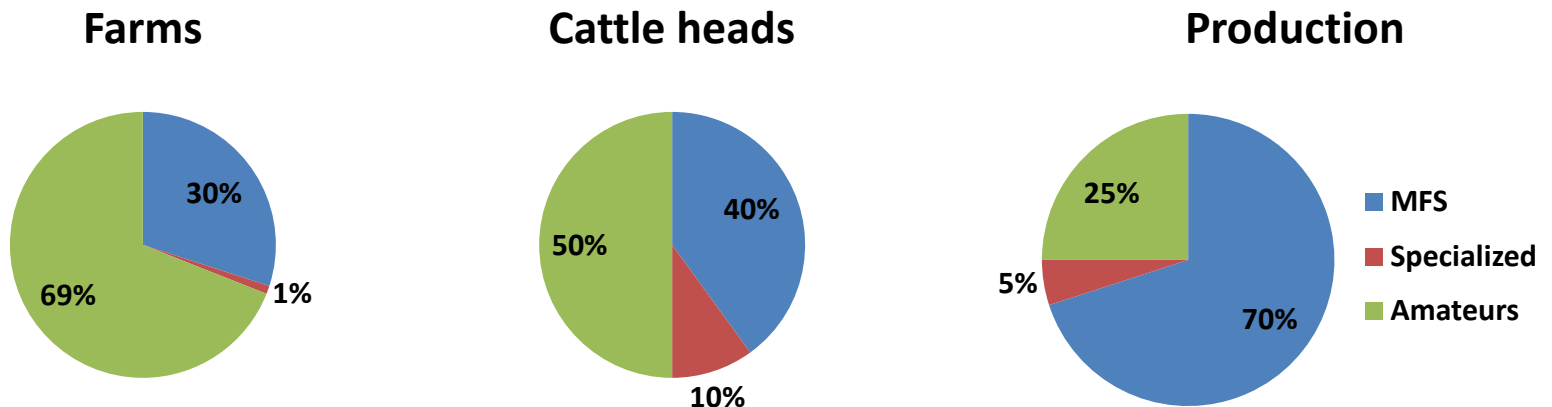
- ❖ In the base situation, similar mean productivity per ha, but higher income (less steers/ha to achieve the same stocking rate; compensated by higher price)
- ❖ Negative factors may reduce drastically the productivity (- 15 pts of production, - 18 pts of income)



# 3. Impact on production systems and beef sector (1/3)

## Diversity of production systems

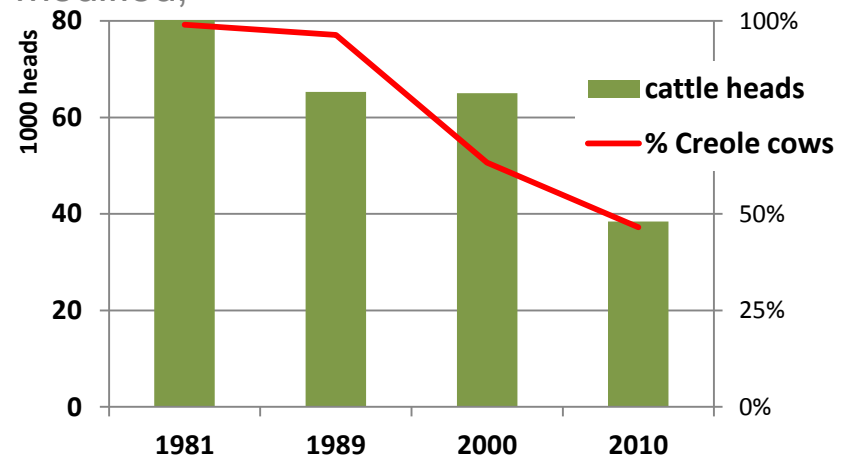
- ❖ Most of beef production systems in Guadeloupe are **mixed farming systems**, in small to medium farms with multi-purpose activities, more or less integrated.
- ❖ Crossbreeding often associated with improved animal production practices (AI, complementation, health control,...) in **specialized beef farms**
- ❖ Creole cattle remain the base of **traditional and “amateur” herds**, often maintained with less technical interventions, and a very low productivity



# 3. Impact on production systems and beef sector (2/3)

## Importance of crossbreeding

- ❖ Technical and economical results often biased by the confusion between breeding orientation and technical management
- ❖ However , in specialised farms, higher production costs (inputs, concentrate, treatments) and losses (reduced fertility and higher mortality) are registered
- ❖ In particular the annual costs due to ticks and associated diseases were estimated to 1.5 M€ (42 % for tick control, 58 % for production losses)
- ❖ But finally, herd structure was deeply modified, with about 55 % of crossbred cows and 75 % of crossbred calves born

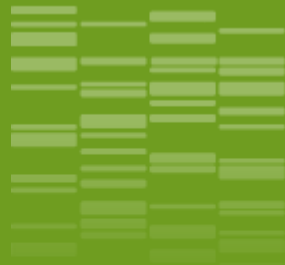


# 3. Impact on production systems and beef sector (3/3)

## Consequences in the beef sector

- ❖ Heavy subsidies dedicated to beef cattle, mainly for technological transfer:
  - suckling cows and slaughtered beef grants
  - support to inputs and import of purebred animals or AI (3.5 M€ / year)
  - tick control (0.7 M€ / year) (or eradication campaigns, which failed)
- ❖ These subsidies oriented mainly to the organized sector, which represents 15 % of herds / heads, and 20 % of the production, mainly in medium to large exploitation, more intensively managed.
- ❖ With some fluctuations, total meat production declined (~3500 to ~2500 TEC) while mean carcass weights (220-230kg) didn't really changed in 3 decades
- ❖ Most fluctuations were due to weaknesses in beef sector organisation (more than 6 commercial organisations created / failed in 30 years)





(Photo M. Naves)

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# Conclusions



# Conclusions

## Intro

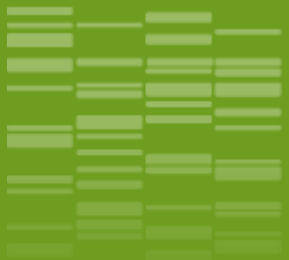
- ❖ Crossbreeding with Limousin cattle improved substantially the individual growth (+10 to 15 % according to the phase), and to a lesser extent the carcass traits (about 5 %).
- ❖ But well managed Creole cattle can achieve good results, and may compete with crossbred calves, specially at pasture.
- ❖ Better price paid for crossbred explain most of the incomes
- ❖ Known weaknesses of crossbred animals (reduced fertility, susceptibility to internal or external parasites, higher mortality, ...) may severely impair the benefits

# Conclusions

## Intro

At a global level, ambiguous results are revealed:

- ❖ Adoption of crossbreeding (with other technological transfer) have modified drastically the structure of the local herd
- ❖ But beef production didn't improved, or either have declined
- ❖ Subsidies given to the beef sector to promote crossbreeding only compensate the losses due to higher sensitivity of crossbred cattle to tropical constraints (climate, parasites, diseases,...)
- ❖ Better management, coupled with preservation and improvement of the local breeds, with controlled use of crossbreeding, may prove more efficient and cost effective



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Thank you for your attention !!

(Photo M. Naves)



64<sup>th</sup>

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